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ABSTRACT

The proceedings consist of 11 papers grouped in two major categories: the context of adult learning (social significance and fact and fiction about adult learning) and the utilization of learning models for adult instruction. Contributors are Floyd B. Fischer, George L. Maddox, Rolf H. Monge, Eric F. Gardner, Arthur W. Combs, William J. Hoyer, Francis J. DiVesta, H. Peter Dachler, Rayman W. Bortner, David P. Hultsch, Samuel S. Dubin, Tom Hickey, and Robert M. W. Travers. A summary synthesizes the papers in a philosophical vein with comments on conceptualization of learning as related to an internal system of human control; operant psychology and individualized learning; information processing models, reflecting both internal and external loci of control; expectancy models (as part of motivation theory); and the effect of educational technology on learning as a socializing experience. The comments reflect subjects discussed in the second major section. References are included after each paper. (MDW)

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CONTINUING EXPLORATIONS:

STUDIES IN CONTINUING EDUCATION

ADULTS AS LEARNERS

PROCEEDINGS OF A CONFERENCE

RAYMAN W. BORTNER, SAMUEL S. DUBIN
DAVID F. HULTSCH AND JOHN WITHALL

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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Proceedings of a Conference

Edited by

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PREFACE

Over and over again, those charged with educating adults have experienced two related problems. One problem is that older adults appear to have greater difficulty in learning than younger adults. Part of this problem may stem from the educator's ignorance of age-related learning deficits and the strategies which have been developed to overcome them. In order to perceive the possibility that effective learning strategies can be adopted with adults, one has first to overcome the myth that "you can't teach an old dog new tricks." The second problem is that there is no clear understanding of the degree to which basic theories of learning apply to adults as learners.

Because of this unclear and unsettling state of thinking regarding the conditions and strategies for helping adult learners, some of us at The Pennsylvania State University decided to bring together, in a conference, individuals in this domain who collectively could give us the benefit of their expertise and raise some issues central to the matter of adults as learners.

May 8th, 9th, and 10th, 1974, were devoted to hearing from persons concerned with adult learners from 18 years to 98 years. With their help, we examined and explored some of the issues that were relevant to the topic Adults as Learners. The following document represents the fruits of the examination, analysis, and integration by several knowledgeable individuals, practitioners, and researchers in adult and continuing education, industry, and higher education.

More specifically the objectives of the conference were to: Examine the applicability of four current and classical learning models to the learning processes of adults, assess the utility and relevance of these models for adult learning, explore the need for a more encompassing theory to fit some of the facts emerging in the area of adult learning, identify impelling research issues in adult learning, and develop the awareness and interest of colleagues in companion institutions - academic, technological, and industrial - who are involved with adults as learners.

ACKNOWLEDGMENTS

The time and efforts expended by individuals from the following organizations contributed greatly to the success of this conference: the Pennsylvania Department of Education and Region III, Adult Education Staff Development Project; the Gerontology Center, Institute for Study of Human Development; the Colleges of Education, Human Development and the Liberal Arts, and Continuing Education of The Pennsylvania State University.

PURPOSE AND GOALS OF CONFERENCE: MUTUAL EXPECTATIONS

Floyd B. Fischer

The Pennsylvania State University

I want to welcome all of you to this conference on Adults as Learners. The program plan represents a timely opportunity for intensive study and discussion of a topic which today is evoking the concern not only of educational leaders but of society as a whole. People everywhere are expressing interest in a concept which - although, in itself, it is far from new - is securing new and compelling attention from many educators, businessmen, industrialists and community leaders. Adults as learners is a subject of immediate and widespread concern.

Right at this early point, I'd like to commend the academic program planners for their insight in developing this conference. My special thanks are extended to Professors John Withall, David Hultsch, Rayman Bortner, and to Professor Samuel Dubin who is on leave and could not attend.

I also wish to express appreciation to two groups which have provided developmental funds for this conference. The first is the Penn State Gerontology Center, headed by Dr. Joseph Britton of the College of Human Development; the second is the Adult Education Staff Development Program, with regional coordination provided by Mrs. Jesse Ulin of the University of Maryland, and with state coordination provided by Dr. Clair Troy of the Pennsylvania Department of Education.

We appreciate the support of these people and hope that this will be the first of a series of annual national conferences in this area.

It is true, of course, that educators have been concerned with adult learners for many years - with learners not a part of the traditional and routine process of formal education. In the early years of its history, Penn State, along with other land-grant institutions, helped lead the way in providing special programs and courses aimed specifically at adults. Indeed, we have, over the years, developed an extensive array of such activities - for the adult part-time learner, who for one reason or another has found it difficult or undesirable or impossible to participate as a full-time student in traditional educational programs.

Yet it is only within the past few years that this kind of activity has been arousing the concern of general educators. And the reasons are not hard to find. Changes have been taking place in the attitudes not only of educators but of the general public as well. From many points of view, there is increasing recognition of the need for new approaches and new techniques in education.

For generations, the typical student was thought of as fitting into a lock-step pattern, proceeding with his studies without interruption from childhood until what was called the "completion" of his education. For all practical purposes, people were expected to "finish" their period of formal learning before entering the world of work. Any additional training in which they engaged beyond that point was for the most part incidental.

But within recent years, there has been a gradual change in the traditional view of education - a change which in terms of its results is

having a dramatic impact on the educational system and on society as a whole. There has been a growing dissatisfaction with the lock-step pattern, a growing recognition of the need for change. The rapid growth of new knowledge has rendered obsolete the concept that education can be "completed." All of us are recognizing the fact that learning - in whatever form it takes - is a lifelong process. And we are beginning to understand that our traditional attitudes toward learning must be adjusted to conform to this recognition.

In a variety of ways, we are beginning to make the necessary adjustments. First of all, within our postsecondary institutions we have developed a whole array of what - for want of a better name - are called "non-traditional" arrangements: external or extended degrees, credit by examination, evening schools, open universities, work-study programs, weekend colleges, summer or vacation colleges, television colleges, universities without walls, and so on and on - arrangements which, in one way or another, are responsible for radical changes in our concepts of what a student is or should be. According to recent estimations, such external or extended degree programs are growing at the rate of one per week in the United States.

More than this, there has developed within industrial occupation groups and the professions a wide range of educational requirements and needs. More and more members of professional and occupational groups are motivated to continue their education either by salary incentives, peer group pressures or legal relicensure or professional certification standards. Some, such as teachers and police officers, have their salary increments based upon continuing education achievements. In medicine,

dentistry, pharmacy, veterinarian medicine, public accounting, and in many other fields, there are specific educational requirements for the practicing professional. Most federal employees receive organized learning experiences within the federal establishment. Many major corporations either operate their own schools for their employees or have contractual arrangements with universities or proprietary schools.

This month the American Council on Education is preparing to publish a report of its ad hoc Committee on the Financing of Higher Education for Adult Students. I had the good fortune to serve as a member of that committee and the report, in my opinion, provides some of the most definitive and comprehensive information and data ever compiled about adult part-time education in the United States.

The report defines adult students as all part-time students who have completed secondary education or who are beyond compulsory school attendance age. The report emphasizes particularly that adult learners have four different types of motivations and behavioral patterns, only one of which is shared significantly with regular full-time students:

1. I have already mentioned the motivating factors for continued learning in industrial occupational groups and the professions (salary incentives, peer group pressures, legal relicensure or professional certification).
2. In addition, many adult students are employees of organizations and participate in organizational education programs usually designed to achieve organizational rather than individual goals, although the two are often compatible.

3. Other adults participate in or are recruited into federal or state categorical public problem-solving programs, such as law enforcement assistance programs (to provide more effective law enforcement), drug abuse education programs (to assist in reducing drug abuse), or other programs well known to you.
4. The fourth motivation is that many adult students attend school for personal and family reasons. This motivation is shared with most full-time students.

Also significant for our conference today is other data developed by that ACE study. In 1972, for example, for the first time in American history, approximately half of all students enrolled in programs of our colleges and universities were adults participating on a part-time student basis (5.93 million part-time students versus 5.81 million full-time students according to the Census Bureau). The rate of increase in numbers of collegiate part-time adult students between 1969 and 1972 was 3-1/2 times as great as for full-time students (a 35.5% increase for part-time adult students versus a 10.1% increase for full-time students).

Since 1969 more students have participated in <u>all</u> postsecondary education on a part-time basis (credit and non-credit) than on a full-time basis by the substantial margin of 55% to 45% in 1969 (13.04 million versus 10.65 million), and 57.5% in 1972 (15.73 million versus 11.60 million). In other words, the number of part-time adult students in <u>all</u> postsecondary institutions increased at a rate 2-1/3 times faster than the increase in full-time students.

Adult students are, without a doubt, the new majority in higher education in the United States.

Even in our regular higher education programs, a large proportion of the students involved are for all practical purposes adults. For example, in the entire college student population throughout the country in 1970, 43% were over 21 years of age. And in the non-traditional degree programs, the situation is even more striking. In the oldest program of this kind, the University of Oklahoma's bachelor of liberal studies program, over 75% of the total students have been in the 31 to 50 age group. Data on the more recently established New York State Regent's external degree program indicate that the median age of enrollees in April 1973 was more than 38 years, with a range of 18 to 67. The median age of the students in the California State University and College external degree program was 32 in the spring of 1973, with over 60% between the ages of 26 and 40. At the open university program at the University of Maryland, students averaged almost 36 years in 1973. Indeed, in postsecondary education as a whole in 1972, of the part-time students, 55% were between 25 and 44 years of age and almost 25% were over 45 years old.

And as we look toward the future, we can expect even greater increases in the numbers and in the age of adult learners. Since 1900, life expectancy has increased from 47 years to 71 years today and by the year 2000 it is estimated that nearly 30% of the American population will be over 50. Simultaneously, the average workweek has been reduced from 62 hours in 1900 to about 37-1/2 hours today. Moreover, the four-day workweek has been introduced and many workers now retire early.

The motivations for adults to continue their education, which I mentioned earlier, and some other facts now known to us speak also to the major patterns of financing education for the adult student. Part-time

adult students are both the recipients of the most advantageous financial arrangements possible and the least advantageous financing arrangements. The most advantageous is when an organization or industry pays the full salary and all sussistence - travel, tuition, book costs, etc. - for an employee to pursue his education. At the other extreme - the least advantageous - is when low-income, fully employed persons not only have to pay their own tuition costs because they are not eligible for student aid, but they must also participate on their own free time and pay taxes on their income without deductions for educational costs, unless the program is directly work related.

Regardless of family income, part-time adult students on the whole are massively discriminated against in federal and state student and institutional aid programs, social security survivors' benefits, institutional tuition rates and financial aid programs, and income tax requirements.

Examples:

1. Except in categorical student aid programs and loan programs, they generally are not eligible for or able to obtain federal student aid.
2. Social security survivors' educational benefits are restricted to full-time students at all levels, including postsecondary.
3. Only 4 of the 28 states with needs-based student aid programs provide any eligibility for part-time adult students.
4. Only one state provides equal funding for part-time adult students and full-time students in institutional aid formulas.

5. 59% of all four-year institutions of higher education charge higher tuition fees for part-time adult students and 34% of all institutions deny student aid to part-time adult students completely.

6. Employed adult students who are denied eligibility for student aid pay taxes on their income without deductability for educational expenses unless it is directly work related, while full-time students are exempt from taxes on their student aid payments.

In a recent article in The New York Times, Dr. Ernest L. Boyer, Chancellor of the State University of New York, commented on the need for educators to adjust their thinking to this new situation. "From one perspective," he said, "our colleges and universities face retrenchment and consolidation. But we also face the dramatic challenge of lifelong learning, a revolution that is already under way." "Higher education," he declared, "must be viewed not as a prework ritual but as a source for everyone from 18 to 85 and beyond . . . . We must begin to give more than lip service to the education of older men and women."

For many years those of us who have been concerned with the teaching of adults have recognized some of the difficulties that exist between the learning patterns of adult students and those of the youths we have been more accustomed to teach. In the ACE report of financing of adult students a number of those differences are examined.

In terms of seriousness of purpose, the report concludes that "part-time students are as interested in serious academic study in a

broad range of scientific, professional and cultural pursuits as their full-time counterparts."

Quoting the results of a recent survey of nearly 5,000 adult students, the report states that 87% of the men and 65% of the women responded that an "increase in earning power was the prime expectation from their courses." Over half stated that a major purpose in enrollment was to "prepare for a position in which not now employed." And while only 10% of adult students had dropped the courses they were taking, almost half of the full-time students at two-year and four-year institutions drop out before completing their programs.

In terms of relative ability, it is often assumed that adult students do not possess the same capacity to learn as their younger counterparts. Here too, the ACE report provides a perspective in a quotation from J. R. Kidd: "The physical and sensory equipment of people of all ages is ample for most kinds of learning if used efficiently. . . . There is nothing about aging itself which prevents or seriously hampers learning. . . . Continuing education has become an important enterprise for millions of adults, and the effectiveness of such education is a matter of social and national importance."[1]

How can the teaching of adults be made more effective? What differences, if any, exist in the learning patterns of adults as compared with those of youth? And if such differences exist, how can techniques of instruction be developed or improved to take advantage of these

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[1]J. R. Kidd, How Adults Learn. Association Press, 1959, p. 130.

differences? It is our hope that this conference can be at least a first step in finding answers to questions of this sort. By bringing together the results of our separate experiences, and by examining the applicability of current and classical learning models to the learning processes of adults, we can, hopefully, provide a better understanding of an important aspect of modern education. We also may be able to make a beginning in the development of a rationale for enabling our citizens to participate more effectively in the process of lifelong learning.

THE SOCIAL SIGNIFICANCE OF ADULT LEARNING

George L. Maddox

Duke University

Introduction

Assessing the social significance of ideas and activities is a [illegible] task which is frequently ignored or avoided by scientists. Thomas S. Kuhn suggests why this is so when he argues persuasively in The Structure of Scientific Revolutions (1970) that normal science is "a strenuous and devoted attempt to force nature into the conceptual boxes supplied by professional education." The paradigms of normal science identify significant facts, match fact and theory, and organize the propositions which purport to describe and explain various aspects of reality. Scientific research does not ordinarily aim to produce either conceptual or phenomenal novelty and, when successful, produces neither. Scientists are essentially puzzle-solvers whose paradigms suggest which puzzles are interesting and solvable and which are not. Hence prevailing paradigms of a scientific community often tend to isolate scientists from problems which are not easily reducible to puzzle form. Socially important and pressing problems such as a cure for cancer, designing a lasting peace, or, I might add, designing a system of lifetime learning, are usually not considered interesting puzzles largely because they may not, or do not appear to have, a definitive solution. Unlike engineers, physicians, or educators, scientists need not choose problems because they urgently

need solution or choose their problems without regard to the availability of tools necessary to solve them. Social scientists are more likely than others to defend the choice of problems in terms of social significance. Yet it is a fact, which Kuhn generously ignores, that although social scientists know the rhetoric of social significance, they demonstrate the same recognizable preference for solvable puzzles attributed to scientists generally.

The allocation of intellectual resources in scientific communities to various problems has no easily identifiable pattern and reflects no master plan. One certainly does not get the impression that the allocation of intellectual resources inside or outside universities is guided by notions of social significance. As a case in point, Kenneth Boulding (1971) has commented on what he labels "the misallocation of intellectual resources in economics." He reviewed publications in economic journals from 1896 through 1965 and observed some peculiar allocations of intellectual resources among economists. In the decade 1955-1965, for example, agriculture, which accounts for about 5% of the Gross National Product in this country, accounted for 9.3% of articles in journals of economics. In contrast, education, which accounts for 7% of the GNP, accounted for 2.5% of the articles. Schools of agriculture, Boulding noted, have departments of economics; schools of education do not. Boulding's illustration is an instance of a common observation: scientists do have a way of avoiding certain areas of inquiry no matter how insistently reality grinds against the body of their theory.

The community of scientists has, as Amiti Etzioni recently noted, helped free us from Nature but not from ourselves. Science has extended

our hands and legs more than our heads and hearts. We hurl missiles into space and walk on the moon. Yet in 1971, a national survey documented that over 21 million adults in this country lacked elemental reading, writing and computational skills at the "survival level." Many adults are not able to use a telephone book or complete a simple job application. As recently as 1970, almost 6% of young men examined by the armed services failed the basic mental tests (Digest of Educational Statistics, 1972; Perspectives of Adult Education, 1972). In an affluent, resourceful society this is scandalous and unacceptable. And there are other indications of our indifference and lack of imagination.

The provincialism of the scientific community notwithstanding, we are experiencing increasing unrest and may in fact be faced with a threatening opportunity of revolutionary proportions in adult learning and adult education. If the scientific community's provincialism is as great as some think it is, we are probably well into this revolution already and simply have not recognized the vital signs.

Signs of Unrest

The warning signals abound which indicate that age graded, youth oriented, sequential, lock step, standardized organization of learning and education is giving way to alternative options.

The prestigious Carnegie Commission on Higher Education has been sending some unmistakable signals for quite awhile. In "Less Time, More Options: Education Beyond High School" (1971), for example, the Commission recommends that opportunities for higher education and degrees should be available to persons throughout their lifetime, not just immediately

after high school. The special needs of low income persons, women, and individuals in late life are specifically noted. The ninth recommendation of the report is to the point:

> "Society would gain if work and study were mixed throughout life, thus reducing the sense of sharply compartmentalized roles of isolated students versus workers and of youth versus age. The sense of isolation would be reduced if more students were also workers and if more workers could also be students; if the ages mixed on the job and in the classroom in a more normally structured type of community; if all members of the community valued both study and work and had a better opportunity to understand the flow of life from youth to age. Society would be integrated across lines that now separate students and workers, youth and age."

The rhetoric of revolution appears in another report of the Commission, The Fourth Revolution (1972). The title is based on Eric Ashby's suggestion that new learning technology based on electronics has brought us to an educational revolution five centuries after consolidating three earlier revolutions - instruction in schools rather than at home, the written word as a supplement to oral traditions, and the invention of printing. The Commission comments approvingly on our increasing ability to reach the neglected learner - the sick, the handicapped, the aged, the imprisoned, and a wide range of adults - who through the happenstance of geographic and social location cannot utilize available resources for learning. The new technology will tend to draw, or push, instruction

from the historical "requirements met through teaching" approach to a "resources available for learning" approach. This is a fundamental change. All instruction, the Commission predicts, will become more analytic in its approach; instructors will become more conscious about instructional methods. More instruction will be off campus; there will be fewer residential students; and learning resources will be available 24 hours a day. The United States is well on its way to joining Japan and Great Britain in large scale experiments with Open Universities.

The Carnegie Commission reports are describing as well as advocating some fundamental changes in the way we are thinking about learning and education. During the 1960's, two educational concepts grew strong - career education and lifetime learning (Perspectives of Education, 1972). The emergent concept of career education was not based solely on the recognition of a need to upgrade job skills in a rapidly changing society, important though this is; an emphasis on the relevance of education for a meaningful and productive work experience and for self-fulfillment was also a consideration. And, while the emphasis of the Commission on life-time learning recognized the need to upgrade work skills, it also reflected an awareness of a need to understand adult experience in the interest of improving the capacity to govern themselves in a democratic society.

A number of factors underlie the emergence of the Learning Society. The efficacy of schooling which gives terminal degrees to the young and encourages them to think that their education is complete appears to be increasingly questionable and ridiculous. As democratization of education has proceeded, the economic utility of higher education has become increasingly less obvious. The inability of educators to prepare students

for indefinite futures in a changing environment, on the other hand, has become increasingly obvious. Thoughtful educators in professional schools, for instance, know that lifetime certification of graduates is probably dangerous, not just a curious social custom. Educational certification simply does not insure competence in performance over a lifetime.

Society is changing too. We are continuing to redefine and redistribute work and leisure and, with the prospect of a guaranteed wage in the foreseeable future, the meaning of work and the attractiveness of learning as a recreational activity are being reconsidered. As new learning technologies emerge, we have less and less reason to equate learning with education as we have known it in the past.

The warning signals ought to be so clear that even scientists in the isolated splendor of universities can read them. There are indications that the message is being read and, to some extent, understood. As a case in point, gerontologists are contributing to a needed reconceptualization of lifetime learning in the emerging Learning Society. For our purposes, older persons provide a commentary on the way in which institutional arrangements for learning operate. They also provide a relevant and challenging population for exploring the human potential for learning. For illustrative purposes let us consider older persons as a test case in what we mean when we propose to implement the Learning Society (see Eklund, 1969). In choosing this illustration, we do not prejudge the social significance of learning and education in late life vis-a-vis learning and education at any other point in the life cycle. We simply assert that learning and education in late life are socially significant and warrant our attention.

Implementing the Learning Society

If we are to talk seriously about the implementation and guidance of the Learning Society so as to include older persons, we must give serious consideration to our knowledge base, our decision strategy, and our power base.

Knowledge Base

The capacity of older adults for learning is substantial. Jack Botwinick, a friend and colleague for many years, recently sent me his latest book, Aging and Behavior: A Comprehensive Integration of Research Findings (1973). He documents that in the last several decades of gerontological research a lot of intellectual underbrush in our conception of human functioning in late life has been cleared. We now know beyond reasonable doubt that chronological age per se is a poor predictor of both performance and learning ability. Rigidity and cautiousness it seems, are not unitary and inevitable characteristics of late life; rigidity and cautiousness are complex and ambiguous phenomena involving to a substantial degree cultural and experiential factors which are quite independent of age. And, while there is agreement that intellectual performance in old age declines, there is no such agreement about changes in learning ability. Learning ability, it turns out, involves more than the functioning of neurons. Motivation is involved in learning and factors affecting motivation such as task meaningfulness and involvement need to be better understood than they are currently.

This reference to Botwinick's summary of research is not an attempt to summarize with inappropriate brevity a complex and well documented

body of findings. He simply provides a convenient way for me to avoid the distraction of lengthy documentation.

The capacity for learning in late life, and a fortiori in adulthood, is established. This is the essential message.

Paul B. Baltes (1973) in the lead article of a recent symposium report he edited draws a similar conclusion. Life-span psychology, he argues, has devoted considerable attention to winning a single but important objective: Development occurs at all ages and ignoring this fact is theoretically unjustified. Moreover, "the usefulness of the life-span view of aging is most explicit," he argues,

> "when prevention and optimizing gerontological intervention is at stake . . . (because this perspective is) apt to redirect conventional thinking by focusing on experiential life history antecedents and the modifiability of the aging process."

In a very useful paper with G. Labouvie, Baltes (1973) again stresses the importance of moving beyond description and explanation of intellectual performance in adulthood to a frank consideration of experimental modification of performance. We need to take seriously the one-sidedness of discussions of adult learning in focusing on ability alone and explore the impact of environmental effects. The potential for redesigning the aging process and learning in late life remain to be explored seriously.

This call for a serious and systematic review of person/environment interaction is certainly in order. It is currently an article of faith that most of our inferences and conclusions about observed behavior in

late life are confounded by our failure to distinguish cohort, time of measurement and age (e.g., Schaie, 1973). Personal biography is to a substantial degree the product of and is constrained by social events and situations. What an individual is observed to do and what an individual is capable of doing are not necessarily equivalent. This is the message carried variously by persistent references to "the Hawthorne Effect" (Parsons, 1974), by criticism of trait theory in psychology (Mischel, 1969), and by the Coleman Report on Equality of Educational Opportunity (1966). We badly need sophistication in the conceptualization of environments that will match our belief in the importance of environmental factors in explaining and modifying human performance.

Discussion of the social as well as physical contexts in which cohorts of individuals develop and within which they perform has increasingly made us sensitive to some important demographic and sociological facts. The central fact is that reference to the elderly is no longer justified, if such a reference was ever justified. Currently, for example, demographers note that persons 65 years of age and older constitute about 10% of the population and are growing at a rate faster than any other age category. But they also note that one third of this older population is 75 years of age and older. While older persons are disproportionately represented among members of our society who are poor, uneducated, and sick, a bland undifferentiated product is not observed in late life. References to the elderly, the adult, the adolescent, the female, or the Black, illustrate intellectual laziness more than they mirror reality. Emerging comparisons of the physiological, psychological, and sociological characteristics suggest that even among older persons a

distinction between "the old" (65-75) and "the old old" is useful. Moreover, there is increasing interest in the age category 55-65, which includes individuals who might be called "the young old." This age category is proportionately as large as the category we have conventionally called "old."

The logic of cohort analysis also reminds us that the current "young old," "old" or "old old" are not necessarily an accurate forecast of the individuals who will inhabit these categories in the future. Consider, e.g., the educational experience projected over the next several decades for successive cohorts of persons 65 years of age and older. In 1975, the median number of years of education completed for the older age category is 8.9. In each succeeding five years through 1990, the median years of education completed is projected to increase by approximately one year. The median years of completed education in 1990 is estimated at 11.8, essentially graduation from high school (Siegel and O'Leary, 1973). Important implications flow from such observations. The questionable utility of chronological age as a predictor variable is further reinforced. And the utility of viewing late life as an integral, largely continuous, segment of the human life-span is reinforced. This conference is well advised to focus on adults, not simply old adults.

Our knowledge base about the capacity to learn in late life is considerable. Failure to explore this capacity systematically is explained not so much by the limitation which lie within adults as by the ambivalence and inertia of professionals like ourselves. The future of adult learning and adult education in this country will be determined less by existing scientific knowledge than by the imaginative and humane use of

the knowledge and resources already at our disposal. This nation deserves an imaginative national policy with regard to adult learning and education.

Developing Policies and Strategies

Although we may need and deserve an imaginative national policy on adult learning and education, this development is unlikely in the immediate future (Benson and Hodgkinson, 1974). In planning educational programs we have a long history in this country of muddling through, a strategy known by the more elegant designation "disjointed incrementalism" (Maddox, 1971). Major responsibility for educational policy has been given by default, possibly design, largely to institutions of higher education whose decisions presumably have been guided by the invisible hand of the marketplace. But institutions of higher education over the years, F. Reif (1974) recently observed, have been largely preoccupied with the maintenance of standard educational programs and seem content to formulate educational policy in terms of mundane criteria such as degree requirements, faculty/student ratios or the number of contact hours. With rare exceptions, norms of educational leadership in universities have emphasized reasonable adequacy rather than excellence or innovation. Outstanding educational work by faculty members is frequently unrewarded volunteer activity based on idiosyncractic preference rather than deliberately fostered and rewarded activity. For all the talk about a crisis and impending revolution in education, Reif argues that universities do not take education very seriously.

A badly needed but neglected critical element in an adequate educational policy and a strategy for implementation of this policy is systematic encouragement and support of research on the effectiveness of

alternative modes of teaching and learning. Noteworthy precedents specifically mentioned by Reif are the University of California at Berkeley Group in Science and Mathematics Education, the Massachusetts Institute of Technology Division for Study and Research in Education, the University of Illinois Plato Project, the University of Minnesota Center for Educational Development, and the Open University of Great Britain.

Several considerations should inform our evaluation of alternative strategies of learning (Perspectives of Adult Education, 1972). The first consideration is that our historic preference for concentrating formal education almost exclusively in the childhood and adolescent years is a cultural inheritance, not a requirement of Nature. A second consideration is that more than one system of lifetime learning and education can be effective and satisfactory. The search for a single, optimal educational strategy is not indicated or required by either theory or experience.

A third element of plans and strategies for the future of learning in this nation must inevitably be a realistic consideration of social and economic constraints on innovation. We will necessarily have to deal frankly with issues of equity. Our democratic rhetoric notwithstanding, access to educational opportunity, particularly access to higher education, in this country has historically reflected biases of social class, sex, and age. There are indications that the rhetoric of equality is becoming less ambiguous and more ambitious. We are still quite a way from the policy announced in Great Britain that opportunities in education are not to be determined primarily by reference to broad estimates of

future need for trained manpower but by consideration of the value of education to the personal development of those who pursue it. The emergence of low cost post-high school education in the form of public community colleges in the United States is nevertheless a major factor in converting the rhetoric of educational opportunity into reality. But two major structural obstacles continue to be troublesome in the creation of the Learning Society, financing and the distribution of work and leisure over the lifetime.

We are still uncertain about how to finance the Learning Society. Benson and Hodgkinson (1974) document in detail competing alternative proposals for financing higher education. In this country we still have a decided preference for having the consumer pay his own way; we do make some adjustments in this preference in order to accommodate the economically disadvantaged. Although no totally satisfactory financial strategy has yet been proposed, there is clearly a growing interest in a voucher system financed in part by public money which would permit individuals to consider investing in a variety of learning and educational programs at various points in the life cycle.

The realism of such a proposal depends on more than public enthusiasm for investing general revenues in adult learning and education. A great deal depends on the development of increasing flexibility in work careers so as to permit educational sabbaticals for workers (Kreps, 1971) or in adaptation of learning and educational opportunities to be convenient to individuals who wish to distribute learning broadly over the adult years.

Developing a Power Base for Action

Sustained interest in innovative and increased options in adult learning and education will depend on the mobilization and guidance of the political processes that affect the allocation of social resources. Constituencies will have to be mobilized.

Whether the universities can or should provide the primary leadership for such mobilization and guidance is a moot question. The simple fact is that universities have not typically distinguished themselves by their leadership in the recent past; moreover, university faculties have lived long and comfortably with the rankest forms of biases in the selection and education of students. However, a new force is at work which will provide a new incentive for at least some teachers in higher education to become interested in innovative approaches to learning and education. This new force is the current and projected scarcity of jobs in academe; this scarcity is related to the problem of a current and projected decrease in the proportion of students interested in higher education, particularly in the residential college or university featuring liberal education and graduate work. Benson and Hodgkinson (1973, p. 52 ff) state the issue baldly: An oversupply of qualified young teachers will in the future become increasingly more enthusiastic about open admissions, continuing education, extension courses, and community action. In collective bargaining these same young faculty will also support liberal pensions to encourage retirement of their senior colleagues.

As new opportunities for learning and education develop both outside and inside universities, faculties may find that in the Learning

Society their concern "to publish or perish" has become "to program or perish." There is little doubt, the Carnegie Commission on Higher Education (1972) concludes, that all instruction will become more analytic in its approach and instructors will be more conscious of the methodology of instruction. As this happens faculty members who have been largely oblivious to a rapidly developing instructional technology will discover a large number of eager technologists who are busily serving the Learning Society. These learning technologists are more aware than academicians that a revolution in learning is underway (Carnegie Commission on Higher Education, 1972) and are a political constituency whose professional interests coincide with the public interest.

There is also the potential giant of higher education, the two year college. Thirty per cent of all undergraduates and 25% of all students in higher education are now in community colleges. In 1970, there were almost 1100 two year colleges and they were growing at the rate of one per week (Carnegie Commission, 1972). The number of students in these colleges was increasing at twice the rate of four year colleges (Digest of Educational Statistics, 1972). Their high rate of growth reflects their accessibility, their open admission policy, low tuition, and both variety and flexibility of programming.

But the most substantial power base for innovation in learning and education may prove to be the great majority (82%) of the 120 million adults who at the beginning of this decade are not engaged in any formal learning or educational activity. When large numbers of these individuals discover that learning can be pleasurable and self-fulfilling, a form

of recreation, and not simply vocational preparation, a radical democratization of education will indeed take place.

Adult Learning as a Prime Social Project

In the history of this country technological development in the interest of the expansion of goods and services has been a prime project, perhaps the prime project. Adult learning in the interest of self-fulfillment and social fulfillment is perhaps the prime project of this society in this decade. On the future agenda of expanded opportunities for lifetime learning, the development of job skills and occupational careers will continue to be important. But increasingly the potential for learning as a recreational, self-fulfilling, and socially significant activity will be stressed.

Adult learning and education will play an increasingly significant role in informing an electorate capable of exploring the structure, organization, and control of a democratic society. Attention can be, will be, must be given to pressing societal as well as personal issues, issues such as the persistence of poverty in the midst of affluence, the necessity and opportunity for international cooperation, and the changing meaning of work and leisure.

We are at the beginning of an educational revolution: lifetime learning. A decade hence, let us hope that those of us in higher education can say that this revolution proved to be beneficial because of our efforts, not in spite of our indifference.

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FACTS AND FICTION ABOUT LEARNING IN ADULTS: THE DYING OF A MYTH[1]

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If you are truly interested in sounding the death knell for the myth that "you can't teach an old dog new tricks," you can join me here and now in taking the vow never to repeat it again. Let's cut out the free advertising.

As with most old saws it has reached an advanced old age because it contains at least a germ of truth. There are some age-related learning deficits in old dogs, and in old people. Nevertheless, the myth must die because it is an overgeneralization. We cannot come to know the adults who are our students if we have our perception blunted by preconceived notions of their capabilities. And we cannot be effective teachers if we do not know our students.

There is another myth of which I wish to dispose at the outset of this conference. I will state the myth in the negative - in other words, you are to take the following sentence as a fact. "There is a comprehensive theory of learning that can be used to improve the instruction of adults and that generates meaningful research." We are going to discover that

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[1]The material reported here comes from our final report (see Monge and Gardner, 1972) on Grant No. OEG-1-7-061963-0149, Project No. 6-1963 from the U. S. Office of Education to Syracuse University.

theory together over the next three days. If we don't succeed we will have at least started an interesting rumor, a new myth that is, at least, optimistic in its outlook.

My task today is to give you some information about human adult learners and some ideas you might use to advantage in gathering your own data and in forming your own conclusions. I will not be critical of any theory as it applies, or fails to apply, to adult learners because I know of no theory that has - as of this morning - been constructed about all learning in all adults. The learning theories with which I am familiar are special, as opposed to general, theories even though they are not so advertised. The only human adult about whom much is known in a systematic and rather extensive way is the college sophomore, that epitome of the "three C" population of research participants - the Captive, Cooperative, and Convenient population.

What, then, do we know about adult learners that must be taken into account by a comprehensive theory of learning? And what application can be made of this knowledge in teaching adults?

Let us look at some data from a six-year study of adult age differences in cognitive performance and learning. The study was begun in 1966 at Syracuse University by the late Professor Raymond G. Kuhlen and Professor Eric F. Gardner, whom I joined as co-principal investigator upon Professor Kuhlen's death. This study was supported by the U.S. Office of Education.

This study, completed more than two years ago, involved the determination of adult age differences in a variety of abilities and

personal characteristics of presumed importance to learning at different adult ages. A program of experimental studies was also included.

The Testing Program

Sample

Intact groups of adults in social, church, PTA, other local organizations and industrial establishments were obtained in central New York, with an added elderly sample from Dade County, Florida. These settings select from a wide sample of ages, and probably with minimal bias with respect to various age groups. The subjects were recruited by offering to pay the treasury of the organization a per capita fee for obtaining at least 80 per cent of their active membership as participants.

At least 100 males and 100 females in each of the age decades from the twenties through the seventies participated in this study.

Adult Age Differences in General Knowledge

Tests. A set of twenty-eight paper-and-pencil tests was devised aimed specifically at discerning differential age trends among adults. The most promising of these were refined and used to collect the basic data reported here. The tests were all five-alternative, multiple-choice tests.

Results. One of the major factors in interpreting data related to age has been the fact that not only are there different cultural and environmental situations over any one life span but also the amount of education acquired by people of different ages varies systematically and drastically. Since education is such an important factor in dealing with

data from the kinds of instruments used, raw scores adjusted for education by covariance are presented.

1) Form D-2 was a general vocabulary test. Little sex difference was noted on the mean education-adjusted scores. For males, performance increased from the 20s to a peak in the 60s and declined slightly in the 70s. Performance increased from the 20s to the 50s and remained stable through the 70s for the females.

2) Form TR-2 concerned modes of transportation used over the past 75 years or so. The curves for the two sexes were essentially parallel. Performance increased from the 20s to a peak in the 50s and declined slightly thereafter.

3) Form DD-2 contained items on death and disease. Females, on the average, scored considerably better at all ages than did males. Males increased from the 20s to the 70s, while females increased from the 20s to a peak in the 50s and declined thereafter.

4) Form SL-2 tested knowledge of slang used at various times over the past 70 years. Males increased from the 20s to the peak in the 60s, but the 70s scored quite a bit worse than the 20s. Females increased from the 20s to the 40s, with a consistent downward trend thereafter.

5) Form FI-2 concerned financial matters including investment, wills and estates, and installment buying. Adjusted means for both sexes were together and increased from the 20s to a plateau for the 30s and older.

Summary. If these five tests can be taken as samples of the domain of general knowledge, then it may be concluded that older adults have a greater fund of general knowledge than do younger adults, at least through the normal working years. These data support the notion of a cumulative

model, with age increasing the fund of experience and knowledge upon which the individual can draw. It is not clear why this model generally breaks down in the age decade of the 70s. Examination of the raw scores, which generally paralleled the scores adjusted for covariance with educational level, indicated that the declines noted in the 70s were not an artifact of the adjustment process.

Adult Age Differences in Educational Skills

As a means of assessing the "tools of learning" possessed by adults of different ages the try-out form (Form T-1) of the Adult Basic Learning Examination (ABLE), Level III,[2] was administered to the sample.

Results. The trend of mean scores adjusted for covariance with educational level with age are reported here, as in the previous section.

1) Spelling. Females were superior to males at every age. There was little variation among females as a function of age. Males dropped from the 20s to the 30s, increased to the 40s, 50s, and 60s, with a decline to the 70s.

2) Reading comprehension. Except in the decade of the 20s, males were superior to females in adjusted mean scores in every decade. Females declined continuously from the 20s to the 70s and, except for a rise from the 20s to the 30s, the males also declined across the age span.

3) Reading retention. This was a subpart of the reading test that involved reading of a simulated newspaper for a predetermined interval and then answering questions about what had been read without referring

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[2]See Bjorn Karlsen, Richard Madden, and Eric F. Gardner, Manual for Adult Basic Learning Examination (New York: Harcourt, Brace, and Jovanovich, 1967) for details about the development and characteristics of ABLE.

back to the material read. The sexes were about equal in the 20s and 30s, and then diverged. The males improved slightly to the 60s and declined slightly to the 70s. The females declined from the 20s to the 50s, and remained at about that level through the 70s.

4) Arithmetic computation. Males were superior to females in every decade, with the difference decreasing with age to near equality in the 70s. There was a general and significant decline with age in performance in both sexes.

5) Arithmetic problem solving. Males scored higher than females in every decade, and both sexes declined significantly across the age range.

Summary. With the exception of the scores on the reading retention test, which changed little, and on the spelling test, which changed little for females and was irregular for males, the general picture is one of poorer performance in these basic educational skills on the part of the older persons. The disuse model would appear to be appropriate to describe this trend, i.e., the farther an individual is in time from his early formal schooling, the poorer his performance on school-learned skills in the absence of specific practice.

Adult Age Differences in Learning Orientation

The extent to which adults of different ages are positively oriented toward the seeking of new educational experiences (whether these be in a voluntarily selected course in continuing education or in retraining programs necessitated by change of work) or the degree to which they react negatively to such learning opportunities because of uncertainty or apprehension may, in a practical sense, be of even greater importance than

the abilities or the backgrounds they bring to such tasks. They may, in fact, avoid such situations. But even when involved in a learning program, the level of an individual's performance will likely be determined to no small degree by the extent to which he is "achievement oriented" or threatened by the situation in which he finds himself.

It was necessary in this phase of the study to obtain information regarding four types of characteristics: 1) motivation for learning and achievement, 2) learning apprehension or anxiety, 3) personal rigidity, and 4) cognitive "style of life." A variety of tests was used.

Results. A 2(Sexes) X 6(Age Decades) unweighted means analysis of variance was conducted on each measure with the following results:

1) Demand for achievement. Only the age effect was significant. After a drop from the 20s to the 30s, there was a general increase in score across the remainder of the age range indicating that the older adults felt a greater need to achieve.

2) Learning apprehension or anxiety. There was a significant sex difference on three general anxiety measures, with females rating themsleves higher than males on all scales at all ages. There was no straightforward relationship found between age and anxiety. A "situational anxiety" scale was also administered to see if anxiety generalized across situations with increasing age. In neither sex was age systematically related in a simple way to anxiety level. The sex difference was significant, with females showing less generalization of anxiety across situations than males.

3) Personal rigidity. There was a remarkable increase in scores with age on the short form of Rokeach's dogmatism scale (Troldahl and

Powell, 1965). Females were lower than males at earlier ages (20s, 30s, and 40s), but were higher in dogmatism than males in the later years (50s, 60s, and 70s). The overall sex effect was not significant, but both the age effect and the interaction were significant.

4) Cognitive "style of life" was measured by calculating an "extent of educational participation" score, derived from Ann Litchfield's (1965) Leisure Activity Survey. The results suggested that men vary more from decade-to-decade in the degree to which they participate than women do, that participation for both sexes is higher among people in the 20s and in the 60s than in the other decades, and that better educated people participate more, and more consistently across the age span from 20-79, than do people with less education.

Summary

Examination of these analyses and of other analyses not detailed here leads to several suggestions. First, with respect to the various measures of anxiety, it does not appear that age is related in any simple way to either the level or the generality across situations of "anxiety" as measured by the several approaches used here. There is, on the other hand, ample evidence that the female participants rated themselves higher in every decade on every anxiety measure than did the males. These observations are strengthened by the data provided by a factor analysis, which indicated that the anxiety measures cluster together, that they are positively associated with being female, and that they are independent of age (as well as of education, dogmatism, and vocabulary measures). Second, dogmatism (or closed-mindedness, rigidity, intolerance of ambiguity, etc.) is positively related to age and negatively to

education. An additional analysis led to the conclusion that the lower educational level of the older individual does not appear to be the primary explanation of the positive relationship between age and dogmatism. It was also noted that dogmatism was separated in the factor analysis from the anxiety measures. The correlations of dogmatism with the several anxiety scales were calculated. The highest of these several correlations (+0.18) accounted for only 3.2 per cent of the common variance with the dogmatism score.

Thus, Kuhlen's (1964) explanation of the increasing trend with age in dogmatism or rigidity in terms of increasing anxiety seems not to have been supported by these data. And it cannot be too plausibly argued that dogmatism and anxiety should not co-exist if the former is supposed to be a way of controlling the latter, since Rokeach (1960) finds highly significant correlations between dogmatism and anxiety in seven different samples. However, Kuhlen's hypothesis about the increasing generality of anxiety across situations with age fares somewhat better. There was in both sexes (but more so in the females) a decline in the variance among the ten situations with age, though it was not significant. The downward trend was consistent and regular except for a slight elevation among males in the 50-59 age decade. This should encourage further examination of Kuhlen's hypothesis. One possible explanation for the increase with age in rigidity or dogmatism is that ready-made, stereotyped responses are energy-conserving. Little or no thought is required, and there is little wasted action. And, more often than not, such responses are adaptive. They have, after all, been learned through oft-repeated experience and in a variety of circumstances through a long life. Some of the older subjects

in this study, for example, betrayed something of this in their arguments with the proctors over how to treat the situational anxiety test. Two of the situations were stated thus: "You've received a notice from your bank that an important check has bounced," and "The check-out clerk at the supermarket has just rung up a large bill for you, and you find you don't have enough money." Many of the older people assured us that they would never let such things occur, and how in the world could they imagine how they might feel in such a situation? This unwillingness to experience, even vicariously, might certainly be construed as rigid behavior - but it is also symptomatic of an unremitting caution in important matters that has been translated into an iron-clad routine to avoid both trouble and the expenditure of energy that would be required to put things right.

General Discussion

The need for viewing education as a life-long process aimed at the keeping open of options, or the maintaining of adaptive capacity, should be obvious. The data presented here, though limited in scope and from a limited sample, tend to suggest three things. First, the fund of general knowledge held by adults tends to be greater for older people, indicating that a broader base exists for them upon which to build an educational program. Second, some of the basic educational skills (reading comprehension and arithmetic manipulations) possessed by older people are not as polished as those of younger adults, suggesting that some review and refurbishing of these skills may need to be done in educational programs. Finally, the personality data suggest that older people, especially women, may feel more pressure in the learning context, and that older people of both sexes have a considerably more dogmatic, less flexible

outlook on life than younger people. Whether this implies that older people are significantly less open to new ideas or new approaches to problems cannot be stated with assurance; nevertheless, this information should be an important element in consideration of the design of educational programs.

The Experimental Program

Learning Set

The learning set hypothesis asserts that for one reason or another, older adults do not know how to learn as well as younger people. In his classic paper, Harlow (1949) defined learning set as "learning how to learn a kind of problem, or transfer from problem to problem." Thus, learning set refers to a nonspecific transfer of learning - the transfer of knowledge of the tools and techniques of learning, rather than the transfer of a specific subject matter. In the context of aging, it is proposed that as adults grow older they encounter fewer occasions requiring new learning, and therefore the habits of learning they developed during formal schooling and in the early years of maturity have deteriorated through lack of practice. To illustrate this concept in the classroom setting, the individual who has been out of the routine of formal schooling for any appreciable length of time is likely to have lost a substantial portion of whatever he may have known about how to learn. The reference here is to such "tools of learning" as knowing how to study, how to concentrate or focus attention, how to organize the work, how to take notes, and a myriad of other "mental adjustments" and attitudes towards the process of learning.

The first of the planned series of studies in our research program

was a learning set investigation (Monge, 1969). The major purposes of this study were to examine suggestions that there are, in addition to the deficit due to loss of response speed with age, deficits in concentrating or focusing upon the materials to be learned. The paired-associate paradigm was used. We predicted that the performance of older subjects (aged 60-69) would suffer more than that of younger subjects (aged 30-39) when the time allowed to review the stimulus-response pair was limited. Furthermore, it was felt that if the predicted deficit was due to difficulty in concentrating or focusing upon the materials at a fast pace, then if subjects were given the opportunity to accustom themselves to the experimental situation - in other words, to form a learning set - the age difference should be reduced. The most unusual finding, for which there is no ready explanation, was that the best-performing group was the older group at the slower pace. As expected, however, the older group at the faster pace was worst, and the two younger groups did not differ substantially, although the younger at the faster pace did perform worse than those at the slower pace.

It was hypothesized, remember, that if the faster pace affected the older subjects as predicted, then the deficit might in part be due to an age-related difficulty in concentrating upon the materials to be learned, and that giving subjects the opportunity to accustom themselves to the pace, the materials, and the presentation device - in short, to form a learning set - would ameliorate the difficulty. This appeared to be the case for the older subjects at the slower, but not the faster pace. It might be conjectured that the older subjects at the faster pace did, indeed, form a learning set, but that they learned something other than

what the experiment intended. That is, after learning one or two of the six lists they learned that the easiest way out of the situation was to simply wait out the maximum nine trials, responding only to those items that came easily. In all subsequent experiments with the paired associate technique, therefore, we instructed subjects that they must reach a criterion of one perfect recitation.

A major study in this learning set series was published in 1969 by Dr. David F. Hultsch, now here at Penn State. Dr. Hultsch investigated the ability of males of different ages to organize material to be learned. A 16-trial free recall task was given to males aged 16-19 years, 30-39 years, and 45-54 years. Subjects (Ss) were required to write down after each trial as many of the 20 words presented as they could recall. Three instructional conditions were used: one in which Ss were just asked to recall as many words as possible, a second which suggested that recall would be easier if the words were organized in some unspecified way, and a third which told Ss to alphabetize the words as an aid to recall. Hultsch found that the older Ss recalled fewer words than the high school seniors, although no difference was noted between the two older groups. Furthermore, those of all ages with alphabetization instructions performed best. And although the older men did not recall as much, what they did recall was as well-organized as the recall of the younger Ss. They were, in other words, as able as the younger to use either their own or an instruction-induced organizational scheme.

In a later reanalysis of the data, Dr. Hultsch divided each of the three age groups into two sub-groups on the basis of their scores on a vocabulary test, and looked at the free-recall performance of the high vs.

the low verbal facility individuals. In this reanalysis, he found no significant age differences among the high verbal facility group, nor were there differences due to instructional condition among this group. However, a significant age by instructions interaction was now detected in the low verbal facility groups. Under both the "standard instructions" and "organizational instructions" conditions, the high school boys recalled more words than the two older groups, which did not differ from each other; however, no age differences were detected among subjects performing under instructions to alphabetize their recall.

This presence of an age decrement in the case of low verbal facility individuals, but not among high verbal facility people is quite interesting, particularly since it becomes apparent at such a comparatively early age, i.e., between, roughly, the late teens and the age of 40. Just why this is so is difficult to determine. It does appear, however, that at least part of the age-related decrement in recall performance was attributable to an age-related decrement in organizational processes. It appears that providing lower verbal facility people with a method of organizing material to be learned and recalled reduces age decrements in performance. Dr. Hultsch is presently following up on several suggestions produced by this research, and has published extensively in this field since his original work with us at Syracuse.

Age, Stress, and Cognitive Performance

As noted and implied earlier, one major hypothesis advanced to explain the generally poorer performance of older as compared with younger persons concerns the greater susceptibility of the older to a variety of stressors. This point of view is not devoid of support, as

the literature indicates. There is, however, some speculation about the means by which the effect of an externally-imposed stressor is mediated to cognitive performance. Eisdorfer (1968), for example, challenged the earlier assumption that the aged are usually at a low level of arousal, and suggested that, "Once aroused autonomically, perhaps because of a faulty ability to suppress end organ response or because of an altered feedback system, aged Ss appear to function as if in states of high levels of autonomic activity. Perhaps aged persons are less capable of tolerating heightened arousal."

It should be noted that all of the experimental procedures - and even the testing sessions used to collect the data appearing in the first part of this report - are probably differentially arousing to people of different ages. In every case, there is reason to suspect that the older were more threatened than the younger subjects. Thus age and arousal level have been confounded to some degree throughout these investigations, and inextricably so in the absence of manipulations aimed at equalizing levels of arousal or related processes. In this section are reported one experiment aimed at assessing the shape of the response surface that relates age to various levels of one kind of stressor (namely, constraints on speed of performance), and one experiment that attempted to manipulate the stress engendered by the social setting within which the cognitive performance was required.

The first experiment, an investigation of the effects of the pace of the performance, has been published by Monge and Hultsch (1971). As noted above, this study was designed to map the response surface relating age, anticipation interval, and inspection interval in verbal paired-

associate learning. This study goes to the heart of an issue of great interest in the field of differences in learning processes with increasing age. The issue revolves around the question of whether the usually-noted decrement with age in performance in learning tasks is due to factors related to the basic process of learning, or to factors affecting performance (i.e., the display of learning). Previous studies have pointed very strongly to an age decrement associated with the necessity of making a vocal response under time pressure, but less strongly to a decrement associated with the time permitted to study materials to be learned.

Male subjects were divided into two age groups, 20 to 39 and 40 to 66. Subjects in each age group were assigned at random to one of nine conditions of presentation, namely, all combinations of two, four, and six seconds anticipation and inspection intervals. Each subject learned a list of ten pairs of words to a criterion of one errorless recitation. The anticipation interval effect was significant at the one per cent level, and the arrangement of the means indicated that performance became better as the anticipation interval increased in length from two through four to six seconds. The effect of the inspection interval was also significant at the one per cent level, with the arrangement of the means indicating improvements in performance with increased length of the interval. The interaction between the two types of intervals was not significant. The age effect was significiant at the one per cent level of confidence, with the younger individuals showing better performance, and the interaction of age and anticipation interval was also significant at

the one per cent level with the older subjects benefiting more from increased anticipation interval than the younger.

The picture limned by the present results confirmed the insights gained from previous research on the relationships of performance to age and the two pacing variables. Age interacts with the anticipation interval, but not with the inspection interval, and performance is better at all ages with longer inspection intervals.

This study also provided the additional information that the two intervals interact neither with each other nor jointly with age. This implies that the total time available per item (i.e., the sum of the anticipation and inspection intervals) is not differentially important to people of different ages. Only that portion of total time allotted to the anticipation interval makes for age differences.

Although the focus of this study was on those places in the data where significant differences were found, something more than passing attention should be given to those areas in which differences did not appear if an accurate and complete picture of the age trends is to be formed. It was notable, for example, that in at least one treatment combination the older Ss actually performed better than the younger, although not significantly so. And, as a matter of fact, in no one of the treatment combinations taken singly did the differences between the age groups reach a significant level. And even when the age group means on the anticipation intervals (collapsed on levels of the inspection interval) were compared, only at the shortest interval did the age groups differ. Attention should also be given to the fact that the age factor

alone accounted for only 6.94 per cent of the total variance and, in combination with the anticipation interval effect, for another 4.02 per cent. Thus the role of age, while important, should not be overemphasized.

In the second experiment, which was concerned with variations in the social setting of the experiment, a total of 112 men and 150 women ranging in age from 20 to 79 were used as subjects. All were community-dwelling individuals recruited from the Syracuse, New York area. Two variables were of concern in the experimental design: age and stress manipulation. The subjects were divided according to age into two groups, one aged 20 to 39 and the second aged 40 to 79 years.

Three types of problems were used: verbal reasoning, perceptual reasoning, and mathematical reasoning. All problems consisted of a statement of the problem followed by multiple-choice answers, one of which the subject selected by pressing a button on the apparatus. Each subject solved 18 problems, 6 of each type. In the verbal problems the subject was given a situation and a conclusion. This was followed by some additional information. The subject was to determine if the additional information made it more probable, less probable, or neither more nor less probable that the conclusion was correct. The perceptual orientation problems presented three views of a cube with one letter on each face. The task of the S was to determine which letter was opposite the named letter. The mathematical reasoning items presented an arithmetic problem followed by possible answers. The 18 problems were presented to the subject one at a time on the screen in the subject's console. Within each item type, the easiest item was shown first and the most difficult item last.

An attempt was made to manipulate stress by the context in which the problems were solved. In the low stress condition the subjects solved the experimental problems in private, with access only to their own feedback. Under the high stress condition, the subjects solved the experimental problems in public, with access to the feedback of a "stooge" or confederate of the experimenter. The confederate was a graduate student of the same sex as the subjects, about 25 years old, who followed a prescribed pattern of behavior (as follows) while seated at the middle console:

(1) During the instruction period, the confederate would ask the experimenter an obvious question concerning the problems.

(2) Immediately following the instructions, the confederate mentioned to his fellow subjects that he thought the task was going to be difficult and confusing.

(3) While solving problems, the confederate answered all but one problem correctly, and at an increasing rate of speed.

(4) During the task the confederate made certain comments about how easy the task was.

Under the high stress condition, either one or two subjects were run at once in addition to the confederate, who was always introduced and treated by the experimenter, the receptionist, and other staff as a subject. In the case of the low stress condition, either one, two, or three Ss were run at once, although they were unable to observe one another in the experimental situation because the partitions were extended between consoles.

Following the instructions, each subject attempted the 18 problems, working at his own rate.

The results may be summarized as follows. With respect to the two main variables, age and stress, none of the analyses showed a difference as a function of stress, nor was any interaction of age and stress significant; however, there was an age difference favoring the younger subjects on the spatial reasoning items. Taking the item types one at a time, the results may be summarized thus: (1) Verbal reasoning - A larger difference was found between the males at the two levels of stress than between the females. It would appear that the stress manipulation was more effective when applied to the males. (2) Spatial reasoning - Males were superior to females, and the younger were superior to the older. (As previously noted, the younger subjects and the males also tended to be the better educated.) (3) Arithmetic reasoning - Males were superior to females. (4) On Total score, which is probably a relatively meaningless composite, males did better than females. Overall, the materials seemed appropriate, with plenty of ceiling. Apparently the kind of stress engendered by working in a social setting of the type described here, analogous to a classroom, does not adversely affect older people.

Summary

To summarize all of this, then, we found that older adults have a greater fund of general knowledge than do younger adults, that older adults are deficient in the school-taught educational skills of reading comprehension and arithmetic, but not in spelling or reading retention,

that there is no evidence to suggest that anxiety or apprehension in the learning context increases with age, but that there is an increase with age in dogmatism.

In the experimental area, we found that learning set development occurs as well in older as in younger adults if the pressure of time is not strong. The experiment conducted by Dr. Hultsch on the use of organizing instructions in a free recall task showed that adults over age 30 who were low in verbal facility performed significantly worse than high school students, but that no age decrement existed among high verbal facility men. He also found no age decrement in the ability of men to use either their own or an instruction-induced organizational scheme, but he did find an age decrement in the number of items recalled. The study of the effects of pace of presentation of paired-associates found an age-related decrement in the ability to respond under time pressure, but did not show age decrements in the ability to learn. Furthermore, the age differences were not impressive. Finally, the experiment on the effects of social stress on performance on tests of spatial and arithmetic reasoning revealed a sex difference in favor of males and an age decrement on the spatial reasoning test items only.

I hope this presentation has helped you to know your adult students better and to appreciate some of the facts - and reduce the number of fictions - about adult learners. There are age differences, sex differences, and differences due to level of education achieved - there is, in short, a complex pattern of differences between adults, a pattern not to be easily summarized and captured in a simple-minded epigram.

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HUMANISTIC APPROACH TO LEARNING OF ADULTS

Arthur W. Combs

I think that half an hour is a very short time to talk about experiential learning, but I'll give it a try and state the position from which I think some of the humanists are seeing the problem these days.

Most of us in this audience grew up, I suspect, seeing the problem of learning as essentially a problem in conditioning, as a problem in how to produce some kind of change in behavior. This change in behavior was usually brought about through some sort of manipulation of the stimuli to which people were subjected. This principle, often called the S-R approach, is still the most prevalent one in American psychology and finds its greatest development at the present time in the work of people like Skinner and the behavior mod people. It also provides the basic principle for the accountability movement and for such events in modern educational theory as behavioral objectives, some PPBS systems, performance based criteria for learning, systems approaches - and so on. For some aspects of education that's highly satisfactory, but for others it's almost totally inadequate. It's particularly inadequate for adult education where we are not concerned with specific learning of specific events but where we are trying to find ways of helping adult people to confront problems which are of interest to them.

There are two definitions of psychology in most dictionaries. The first one says that psychology is the study of mental states and processes.

The second definition is that psychology is the study of human and animal behavior. For the last 60 years psychologists have been preoccupied almost exclusively with that second aspect of the problem - seeing the questions of psychology as totally the function of behavior. In more recent years we've seen another kind of point of view coming along in "Humanistic Psychology" which attempts to look at a psychology of persons. The psychology of persons includes both the study of human and animal behavior and, also, the study of human attitudes, feelings, beliefs, understandings. It also includes such things as attitudes, feelings, hopes, desires, values, beliefs, the mental states and processes which psychology historically has not dealt with very well. My particular brand of humanistic psychology is perceptual psychology. I'd like to talk about learning from that point of view.

Let's begin with the basic principle of learning in perceptual psychology. Perceptual psychology sees behavior as symptom, not as cause, and holds that psychological theory must deal with causes as well as symptoms. For that reason we are concerned with perception which we see as the basic causes of behavior. So, we would describe learning then as a problem in changing perception or changing the ways in which people perceive. The basic principle of learning would be this: any information will affect a person's behavior only in the degree to which he has discovered the personal meaning of that information for him. We see learning as a matter of the discovery of personal meaning. The basic principle I've just stated could be illustrated in this way: Let's suppose that I'm driving along to work in my car and I turn on my radio and I hear the latest news broadcast. The first thing that comes on is

the latest Hog Market quotations. Well, I don't have any hogs; so this information drifts through my consciousness - as we say, it goes in one ear and out the other. A little bit later I hear the morning's news and hear that there's been a serious accident this morning at the corner of University Avenue and 13th Street and Mrs. Ethel Brown has been seriously injured and taken to the hospital. I don't know Mrs. Brown, but Mrs. Brown is a person and I'm a person - so that has a little more relevance to me. So I say, "That's a terrible thing, another accident. Something ought to be done about it," and I slow down for a block or two. But let's suppose that Mrs. Ether Brown is not quite that much of a stranger to me, that she's the wife of one of my graduate students. In this case I'd say, "Brown's wife, that's terrible." I think about it all the way to my office. I say to my secretary, "Did you hear what happened to Ed Brown's wife? Call the hospital, see how she's getting along." I say to my colleagues, "Hey, did you hear what happened to Ed Brown's wife this morning?" And, we talk about it. If affects my behavior in many different ways because it has more personal meaning for me. Let's go one step further. Let's suppose Mrs. Ethel Brown happens to be the married name of my daughter, what then? The same piece of information now affects my behavior so strenuously that I drop everything. I behave like a madman. I go directly to the hospital. I do all kinds of things.

I repeat this basic principle then, that <u>any information will affect a person's behavior only in the degree to which he has discovered the personal meaning of that information for him</u>. So, learning as we see it always has two aspects; on the one hand, you have the problem of

providing people with some new information or new experience. On the other, you have to help the person, for he has to do it himself, to discover the meaning of the information which you provide him.

Historically, in education and in most of the learning theories heretofore, we have done remarkably well with the first half of that equation. We are experts at giving people information. Now with all our new gadgets and gimmicks we can give people information faster and more furiously than ever before, except that's not where we're sick. Where we're sick is in the problem of not being able to help people to discover the meaning of the information which we've provided them. The dropout, for example, is not a dropout because he wasn't told; he's a dropout because he never discovered the meaning of the information he was provided. We told him, over and over we told him; but he never discovered the personal meaning and that's why he's a dropout.

The second thing we can say about learning in the perceptual point of view is that learning is always affective and individual. That thought frightens people sometimes when you talk about affective education. They say, "Well, what do you want? Do you want education for intellect or education for adjustment?" As though we had to make a choice between smart psychotics or well-adjusted dopes! What the perceptualist is saying is that any learning that is worth its salt is always in some measure affective, because what we mean by affect is simply the degree of relevance of any information to self which is the very heart of the learning process. Let me give you an illustration of what I mean. Let me give you an illustration of what I mean. Let's take the young woman who has a lover in Vietnam - he's been there a long time, several years.

She gets a letter that he's coming home in six months. He's coming home next month, next week; he's on his way; he's back in the country; it's time to go to the airport; here comes his plane; oh, there he is! Look at you - you're all participating in her emotion and the closer it gets to you, the greater is the degree of feeling which you have about it. And, so it is with affect - what we are talking about when we talk about affect - is the relationship of any information to the self. The degree of affect is simply a measure of the degree to which that relationship has been discovered.

Now what we understand about affective learning is that if there isn't any affect, there isn't any learning. Unless you have some kind of feeling about what is being learned, it probably doesn't exist for you in any really, meaningful way. This also means that we probably ought to stop talking about affective education because that frightens people. But, people don't get frightened when you say "Let's have education that is more relevant" - that's what it's all about - or when we say "Let's have education which produces a positive view of self" - or "Let's have more meaningful education" because that's what we're talking about when we're talking about affective education. A lot of people think that humanists are kind of "do-gooders," that what humanists want is that we should all go around being nice to each other. I'm not a humanist merely because I want to be nice to people although that's a good idea. I'm a humanist because I know that when I pay attention to the human qualities that enter into the problems of learning, people learn better. They learn chemistry better, algebra better, anything better, when we are concerned about these kinds of questions.

With that kind of a point of view, let's talk about some of the conditions which the perceptual psychologist sees as necessary when we want to come up with some kind of learning strategy. There are four things with which we need to deal especially. In the first place we have to create an atmosphere which makes the exploration of meaning possible. Generally speaking, that atmosphere, we know, is generally likely to be more effective if it is challenging but not threatening, if it is encouraging and facilitating, and if it somehow is successful in getting the learner involved in the processes. This is typical not only of learning in education but also learning in counseling which is a form of learning, too. The counselor spends a great deal of time and energy creating the atmosphere that makes examining and scrutiny possible, creating an atmosphere and relationship that makes it possible for the client or patient to look at and confront the problem. So, one of the things we have to do in trying to find ways of putting this kind of a conception of learning into operation is to be concerned with the atmosphere that makes it possible for the person to look in the first place.

We also have to take a good look at the situations and find out what are the barriers that are getting in the way of the student's involvement or the student's getting into the act or the student's being able to look at the problems with which we're confronted. And, you know, if you look around American education you will find hundreds of such barriers, things that prevent people from getting involved. I once asked a group of my students in education why is it that they didn't get involved, and they told me. They gave me a long list of things like grades, grades, grades, that's all that matters. Nobody ever thinks that

the student has anything to contribute that is important. Everything has already been learned and chewed over, and so on and on. But, they ended up with this remarkable statement which all 35 of these students agreed on (It really shocked me). They said: "The things worth getting committed to don't get you ahead in school." That's a fantastic indictment, it seems to me. There are dozens of those barriers which we have to find ways of eliminating from the learning process to make it effective and efficient. It's especially true, I think, when we are working with adult learners.

The second think we need to do is to find some way of relating what we're doing to the question of need. You know, psychologists don't know much about learning, but one thing we do know is that people learn best when they have a need to know. Yet, I suppose, that principle is more violated than any other principle I can think of, especially when we're trying to deal with adults. Take, for example, what we do in college. The college almost never deals with the problem of creating need. Elementary teachers some times do, but people who teach grownups almost never pay attention to the question of trying to create a need in the student to know this which they are about to examine. In college, we select people who would learn whether we taught them or not. As a result at the college level you often have just the worst possible kind of teaching. I suspect that's going to change because one of the things that's happening is that the American public has decided everybody's going to college. That means that college teachers are going to be in the same position as elementary teachers - they're going to have to take the great unwashed public just as they come, and do something with them.

That's going to be very hard on a lot of people that I know at the college level! The point that I'm making, however, is that all too often what we do is to approach the problem of learning or trying to provide ways of teaching people while completely ignoring this very basic principle that people learn best when they have a need to know. A good example of that is a course. A course is a package which you deliver to people whether they need it or not and in an order that has, perhaps, nothing to do with the kinds of ways they see the problem. My good friend Don Snygg used to say, "The trouble with American education is that all of us are busy giving people answers to problems they ain't got yet."

The third thing we have to do is provide some new kind of information or experience. I don't think I have to talk about that very much because that's what we do very well. That's what we have been doing for years. Whenever we decide we want to do something new in education what we come up with is "doing some more," let's have more math; let's have more social studies; let's have more driver education; let's have more education about communism; let's have more language in the early school years; let's have more drug education; and on and on and on. The problems we face in learning are not so much problems of giving people information which we already do very well. The problem is, as I indicated earlier, helping people to discover the <u>meaning</u> of the information, which they already have in many instances. One of the things that is currently misdirecting much of education is the attempt to apply the industrial model to education all over the lot. You know, we ought to know better than that. When industry applied the industrial model to its workers what happened was the workers felt dehumanized and they formed unions to beat the system.

I would like to suggest that's exactly what is happening to our college students these days - they are forming unions to beat the system because they find it so dreadfully dehumanizing in so many ways. The major problem of education, as I see it, is not a lack of efficiency but a lack of humanity throughout the whole system.

The fourth thing we have to do, seeing learning in this way, is we have to find a way of facilitating the search for meaning, actively helping people to explore and to discover the meaning of whatever information or experience we are arranging for and with them. Here we get into a difficulty because we assume, you see, that so much of teaching and learning has to do with giving people information; but I'd like to suggest that a great deal of the most important learning that anybody ever has, has nothing to do with new information.

Some 40 years ago I sat in a class with Carl Rogers, and I wrote down in a notebook a basic principle of counseling. It went something like this: The therapist must have an absolute respect for the dignity and the integrity of the client. Now I haven't had any new information about that question in 40 years, but everyday I discover some deeper and deeper meaning of this principle which I already knew.

Or, let's take an example from where I come from. Down in the deep South in the Bible belt, for years we've been talking about it, we've been going to Sunday School about it, we've been singing about it, we've been reading the Bible about it, we've been having revival meetings about it - I'm talking about the concept of the brotherhood of man. You see, we don't need new information about the brotherhood of man, what's necessary is the deeper and deeper discovery of the full meaning of that

which we already know. And, a great deal of learning needs to be of that character. But, a great deal of what we do in teaching ignores that kind of problem because we're so busy and so hung up on the idea of giving people new information as rapidly as we can pour it into them.

That's basically the problem for much of adult education. Much of adult education is not so much a question of getting new information as it is a problem of discovering the deeper and deeper meaning of what is already known. In this connection, all kinds of things are going on these days attempting to find out how you go about helping people to discover meaning. We have all kinds of experiential techniques - group discussions, values clarification, sensitivity training, encounter groups, experiments, making rounds, synanon approaches, games, and so on - are devices to help people to get into the process of exploring information.

Let me make one more point. I think what is involved here is an addition to our thinking about learning of a different kind of system. I think there are two ways we can approach human problems. One of them is a closed system of thinking in which what you do is to decide on the ends which you have in mind; then organize the machinery necessary to achieve those ends; then put the machinery into operation; and then test whether, indeed, you achieved the ends which you had in mind. That's a closed system of thinking, it is a closed system of learning also. It is a system which operates very effectively in behavior modification kinds of approaches and out of stimulus-response kinds of thinking. It blends very effectively with that kind of learning. There is a place for it, too, especially with respect to the learning of skills. It emphasizes the <u>behavior</u> of the student and the <u>management</u> activities on the part of the teacher.

I'd like to contrast that now with an open system of thinking which is much more appropriate for dealing with most of the learning problems we have to deal with, especially with adults. In an open system of thinking we don't know the ends when we begin. We don't know what the outcomes are going to be when we start. All we have is a problem which needs to be confronted - what I sometimes call the "get-with-it" approach. For example, let's see how this works applied to the problems in the ghetto. If you want to deal with the problems of the ghetto in a closed system of thinking what you do is you sit in your nice air-conditioned office and you figure out what those poor devils down there need. Then, you go down there and you do it <u>to</u> them. Since they haven't had any part of it, they reject it. What we've discovered about working with people in the ghetto is the way to be really helpful is to go down to the ghettos and say, "Hey man, <u>we</u> got a problem!" And, together we face the problem; and none of us knows at the beginning what the outcome is going to be. This should be the characteristic of all learning, and especially adult learning. Adult learning more often than not must be a problem-solving kind of situation in which the eventual outcomes cannot be clearly understood in advance.

In such problems the approach is not on ends and management but rather on processes and the <u>creation of conditions</u> in which the teacher exists as a facilitator, a helper, a consultant, rather than the director of the process. We are beginning to understand in humanistic psychology, as we think about the problems of learning, that we have to be concerned about this kind of open approach to the question. I think we've been preoccupied in American psychology with one way of looking at the problem

of learning for far too long. It doesn't make much sense, you know, to dig a ditch with a teaspoon or stir your coffee with a steam shovel - you need to have different kinds of tools for different kinds of tasks. What the humanistic psychologist is saying is that to deal with many of the problems of learning we have got to move to a conception of learning that has to do with seeing the problem as the discovery of personal meaning rather than the manipulation of events to achieve a preconceived outcome.

THE ADULT LEARNER: AN OPERANT PERSPECTIVE[1]

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In preparing this paper, it quickly became apparent that there were at least three separate areas of operant learning research with adults. These areas can be referred to as 1) problem-oriented operant research, 2) methods of operant instruction research, and 3) operant learning processes research. In order to adequately convey the usefulness of the operant learning model for adult instruction, research representative of each of these areas is included, but only to the extent that it is pertinent to the questions asked of the author by the organizers of this conference. The questions are addressed in the following order:[2]

1. What is the rationale which guides an operant learning approach to instruction?
2. How is the learning environment organized?
3. What is the role of the instructor?
4. What are the methods and strategies of instruction?

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[1]The author is indebted to Robert B. Snow who assisted with the literature review for this paper.

[2]It was useful to the author to combine two dimensions, design of the learning environment and organizing resources and materials, in describing the operant model.

What Is The Rationale Which Guides An Operant Learning Approach to Instruction?

From the operant approach, the rationale by which the instructor is guides, is a pragmatic one - the approach is effective and it is broadly applicable. The operant principle that behavior is controlled by its consequences has been successfully applied in numerous educational settings to create, strengthen, and maintain new behaviors and skills (e.g., see Ulrich, Stachnik and Mabry, 1974). Because its worth has been empirically demonstrated, the operant approach is generally conceptualized as a technology or a science rather than as an art of teaching (Skinner, 1968). Teaching is viewed as the arrangement of reinforcement contingencies by which persons learn, and instructors are persons who are responsible for arranging the learning environment and the materials-to-be-learned so as to expedite learning.

The technology and its methods (e.g., teaching machines, programmed instruction) have given rise to a critical examination of educational curricula, educational practices, and the institutions and systems, which have been designed to facilitate learning. Those who employ these techniques have questioned the approaches to teaching traditionally found in educational settings and have discovered that the most effective way to learn any material is <u>not</u> to be a passive recipient of information. Faster and better learning takes place when the learner actively proceeds at his own rate through materials which have been broken down into digestable units (called bits, modules, or frames). The procedures are becoming increasingly more frequent in college classrooms (e.g., Ferster, 1968; Keller, 1968; Lloyd, 1971;

McMichael & Corey, 1968) as well as in other settings where adults are learners (e.g., Cavanagh & Jones, 1968; Vernardos & Harris, 1973). Thus the rationale which guides the instructor is simply that he applies these procedures so as to bring about effective learning.

How Is The Learning Environment Organized?

Ferster and Skinner (1957) have accurately described operant learning:

> When an organism acts upon the environment in which it lives, it changes that environment in ways which often affect the organism itself.

Basically, the learner operates on (and in) an environment in which there are certain events which strengthen, maintain, or weaken the behavior of the learner. When we consider learners from an operant perspective, it is necessary that we also consider the learning environment. The resources available and the materials to be learned are part of the learning environment, and often are not programmed so as to optimize learning. In these cases, rearranging or reprogramming materials and resources may produce better, quicker, more enjoyable, more generalizable learning.

Several researchers have done outstanding work in conceptualizing and categorizing human behavioral settings. Barker (1968), for example, developed the concept of "behavior setting" while studying at the Mid-western Psychological Field Station. His procedure mainly consisted of analyzing, and categorizing all of the behavior settings in a small Midwestern community. This work is very important, because inherent in the rationale behind operant instruction is a precisely defined

setting. Obviously, different persons respond to the same settings in different manners, and the same person may respond to different settings in a different manner. From an operant point of view, a person's environment and the events in it are functionally defined in terms of their reinforcing, eliciting, and/or discriminative properties. A well-designed learning environment is essentially a learning system, arranged to bring about and maintain specified behavioral patterns.

How to properly organize and present the natural resources in the environment is very much dependent upon just what "type" of environment is best for the development of specific behaviors. Some sort of environmental measuring system must be used. Since each behavioral setting creates different behavioral patterns for an individual, the approach to the measurement of environments is characterized by viewing specific environments for the development of particular behavioral patterns, measuring the environmental variables, and relating the environmental measurements to individual behaviors (Wolf, 1965). This task is particularly difficult when working with adults and elderly because of the wide range of interindividual variability in these populations (Hoyer, 1974). Since it is basic to the operant rationale that educational settings be precisely defined, work which increases the accuracy of environmental measurement and conceptualization is useful. When specific environments can be measured, the natural resources can be organized and presented in a manner which is best suited for learning. Although efficient learning occurs in strict programmed instructional formats, other factors must be considered. Operant psychologists are concerned with creating learning environments

which not only induce learning, but are also socially adaptive for the learner. Such a situation can be created by properly arranging the natural resources within a precisely defined setting.

In addition to reorganizing or reprogramming the learning environment, the quality of educational systems for adults can be improved by giving more careful consideration to what is to be taught and how it is to be taught. Recently, several writers (Flanagan, 1973; Glaser, 1973; O'Leary, 1972; Silverman, 1970; and Winett & Winkler, 1972) have commented on the shortcomings of current educational practices. Flanagan in reviewing inappropriate learning materials and student goals in secondary education, argued that more emphasis should be placed on adapting educational goals to individual student needs. He indicated that the greatest opportunity for improving education is by working with each individual student to help him determine what education is of most importance to him in planning and carrying out the roles and activities he chooses for his life. Quoting Flanagan, ". . . the most efficient educational system in the world is utterly wasted if it teaches people the wrong things." Once the "right" behaviors to be learned are selected, hopefully by the learner, the experimental analysis of behavior approach entails rearranging the events in the learner's environment that do and don't control the behaviors in question.

Operant Learning in A Life-span Developmental Context

It is interesting to note that Sidney Pressey who is considered to be one of the first life-span developmental psychologists (Pressey,

Janney & Kuhlen, 1939; Pressey & Kuhlen, 1957), was also one of the first individuals to develop "an apparatus which gives tests and scores - and teaches" (Pressey, 1926). By 1932 Pressey's "industrial revolution in education" had not occurred, and he expressed his disappointment as follows:

> The problems of invention are relatively simple. With a little money and engineering resource, a great deal could easily be done. The writer has found from bitter experience that one person alone can accomplish relatively little and he is regretfully dropping further work on these problems. But he hopes that enough may have been done to stimulate other workers, that this fascinating field may be developed.

The principles which Pressey forwarded in 1926, immediate reinforcement and the learner proceeding at his own rate, are the basic tools of an operant learning approach. Since that time, literally hundreds of applications of these principles to adult learning and instruction have been undertaken. Similarly, the currently rising interest in life-span developmental psychology is particularly based on Pressey's pioneering work in this area (Goulet & Baltes, 1970; Nesselroade & Reese, 1972; Baltes & Schaie, 1973). In this section the usefulness of viewing adult operant learning from a life-span developmental perspective is evaluated. Particular focus is in terms of identifying instructional objectives.

It has already been mentioned that the precise specification of educational objectives is essential to the operant approach. These objectives often depend on the age of the learner. It is unnecessary, for example, to document the fact that children of different ages are reinforced for different academic and nonacademic behaviors by

socialization agents (e.g., peers, teachers, parents, community members). Although the aims of learning may not be as clearly ordered by chronological age in adulthood, there are generally ordered progressions of social roles (e.g., spouse, parent; employee, retiree) for which there are certain rather well-defined sets of behaviors that are reinforced. Neugarten has made this point from a sociological perspective in her discussions of age norms and social timing (Neugarten, 1970, 1972).

Changing educational practices, and more generally, the changing structure of society (e.g., generational change) influences the objectives of learning. Birren and Woodruff (1973) have presented the issue as follows:

> Together with the rise in the proportion of older persons in the population there has also been a downward trend in the age of retirement. Not only does a contemporary individual spend more time in school before he enters the labor force, because of the requisite knowledge required in a technical society, he also tends to leave the labor force earlier because his skills are antiquated or no longer required. Soon will be the time when the average member of soceity will spend more than half of his or her life outside of the labor force. In the face of these social changes, the goal of education should not be exclusively that of educating for productive skills, but also that of providing continuing opportunity for re-learning or learning new skills and providing a broader basis for an orientation toward the psychological, social, and cultural aspects of the individual's life.
>
> (pp. 310-311)

Whatever we know about the developing individual (his needs, activities, experiences, interests, attitudes) in a changing society is helpful to identifying instructional objectives. The life-span developmental view, in which both ontogenetic and generational changes are taken into account, offers the operant behaviorist a broader and

more meaningful foundation for designing short and long-term educational goals. The operant approach has been considered to be non-developmental in nature not because of its targets or techniques, but rather because its techniques have been shown to be effective in changing the target behaviors of individuals of all ages (Baer, 1973; Hoyer, 1973, 1974). The decision as to which behaviors are to be increased (acquired), maintained, or decreased (eliminated) by the instructor is a function of the goals and the reinforcement contingencies of the educational settings (e.g., factory, office, classroom, conference room, the home).

What Is The Role of The Instructor?

The responsibility of the instructor is to organize the learning environment and the materials to be learned. For any set of instructional objectives, the worth of a given learning program is evaluated in terms of such criteria as speed of learning, the extent to which the learner generates new propositions and manages subsequent learning, the extent to which learning is simplified for comprehension and memory, and the extent to which it is related to the talents and background of the learner (Glaser, 1973). The importance of an organized subject matter was also emphasized by Bruner (1966) in Toward a theory of instruction as follows:

> . . . a theory of instruction must specify the ways in which a body of knowledge should be structured so that it can be most readily grasped by the learner (p. 41).

From an operant approach, and probably from any systematic approach to instruction, what is the best program, structure,

sequence, and organization of learning materials is an empirical question. However, there are some operant learning principles which serve to guide the instructor. At the risk of being too simplistic these are:

1. The instructor must precisely identify instructional objectives.
2. Each learner is to some extent unlike all other learners, and he learns best at his own rate.
3. Feedback, or reinforcement to the learner, should be contingent on learning.
4. Reinforcement should be immediate.
5. The best feedback is positive reinforcement - that which strengthens performance by following it. Mastery of the materials in many cases is an effective positive reinforcer.
6. The materials should be organized sequentially so that feedback can be given for learning.
7. If it is desirable for the learner to be able to apply his new knowledge to contents in addition to that which was programmed, generalization needs to be programmed (for a discussion of the issue of the relationship between specific reinforcement contingencies and those in the "natural" community of reinforcers," see Resnick, 1971; Wolf & Risley, 1971).

The distinction between operant and nonoperant approaches to education are not always well defined. For example, identifying

precise instructional objectives is basic to the operant approach and probably to other approaches as well. This task involves decisions as to the quantity and difficulty level of materials to be learned. Additionally, questions such as, "Should information about the usefulness and importance of the materials be taught?" also need to be answered. Many of the qualities seen as characteristic of nonoperant approaches can be incorporated within operant learning programs. Specifically, some of the criticisms leveled against the instructor who employs an operant approach can be remedied through careful operant programming. To give an illustration, Goodman (1964) has criticized the approach as follows:

> In this pedagogic approach it is only the programmer - the administrative decision-maker - who is to do any "thinking" at all; the students are systematically conditioned to follow the train of the other's thoughts. "Learning" means to give some final response that the programmer considers advantageous (to the students). There is no criterion of knowing it, of having learned it, of Gestalt-forming or simplification. That is, the student has no active self at all; his self, at least as student, is a construct of the programmer. (p. 99)

It should be made clear, if it is not already, that this is a "straw man" instructor who is being criticized. There is nothing inherent in an operant approach which results in these outcomes. The point is well taken, however, that careful attention must be paid to the identification of appropriate instructional objectives, particularly when the instructor has at his disposal effective techniques for bringing about learning.

What Are The Methods and Strategies of Instruction?

Programmed instruction is generally considered to be one of the most significant applications of operant principles to instruction. It involves transforming a "lesson" into a sequence of small learning steps, with reinforcement contingencies being immediate and planned in advance (Platt, 1973). Skinner (1968) has described it as the following:

> Programmed instruction is primarily a scheme for making an effective use of reinforcers, not only in shaping new kinds of behavior but in maintaining behavior in strength.

Programmed instruction involves immediate feedback, small steps, active responding by the learner, and self-pacing (Buckley & Walker, 1970). It has not only been used in educational institutions; its success has been demonstrated in industrial settings as well. Programmed instruction in industry has taken varied forms, and deals with a multitude of learning behaviors. Hain & Holder (1962) found that programmed instruction was a more efficient way of teaching employees than was conventional instruction (lectures). Also, J. L. Hughes of IBM, as reported in Margulies & Eigen (1962), found programmed instruction to be a better method of instruction than the lecture-discussion method. Results indicated that with programmed instruction, reduced time was needed for presentation of the subject material, better test performance resulted, and it was rated as more favorable by the employees.

Operant principles have been applied at the managerial level in order to train managers in control, decision making, planning,

delegation of responsibility, and effective use of time. Cavanagh & Jones (1968) designed a program of self-instruction in order to teach better management skills and the managers in the self-instructional condition demonstrated superior performance in these managerial skills. In a rather extensive discussion of operant conditioning principles extrapolated to management theory Jablonsky & Devries (1972) suggested the following:

1. avoid punishment as a means of shaping;
2. use positive reinforcement;
3. specify the desired behavior in explicitly operational terms.

The behavior of an organizational member is viewed as a "function of the reinforcement contingencies applied by various groups in his environment and of his cognitive assessment of such contingencies" (Jablonsky & Devries, 1972). Their operant model of management is a multi-person exchange model incorporating the notion of peer group influence, and it appears to be useful to industry because it demonstrates a capacity to predict the amount of behavioral change one can expect from an individual within an organizational structure (Jablonsky & Devries, 1972).

In the college classroom Myers (1970) used a programmed instruction course in order to teach introductory statistics. All students received an "A" for a grade if they satisfactorily completed the course. Progress was evaluated in terms of numbers of "units" successfully completed rather than percentage of material learned. Results demonstrated a high level of performance, fewer drop-outs, and

the course was rated as more favorable as compared to control classes. Jamieson (1969) investigated learning arithmetic skills by programmed and guided discovery methods at different age levels. Subjects were 80 females; 20 with a mean age of 11 years; 20 with a mean age of 21.0 years; 20 with a mean age of 40.5 years and 20 with a mean age of 57.4 years. Transfer of learning was greater for those using programmed instruction. Of particular interest in this study was the fact that prior arithmetic ability, and not age, was the more important variable contributing to successful learning of the task. This finding supports the general principle that these procedures are adaptable to learners of all ages (Hoyer, Labouvie, & Baltes, 1973).

In another interesting experiment applying operant techniques to learning, adults were taught job interviewing skills by videotape and role playing procedures (Venardos & Harris, 1973). Results indicated that both the use of videotaped interviews (for modeling and feedback), and the use of role playing as job interview training procedures can produce significant improvement in interview skills. Hence, very practical "survival" skills can be taught using operant techniques.

Conclusions

It is evident that operant conditioning principles can be, and are applied to learning in adults. When the goals can be easily defined, as is often the case in industry, the outcomes of modification can be readily measured. When the goals can be precisely defined, the instructor is often able to design a behavioral setting

in which maximal learning can occur. The basic processes involved are to define the setting, properly organize the resources available in that setting, and then organize the materials to be learned in a manner that they can be readily learned.

Operant conditioning is technologically useful in that it increases our knowledge of the "extraordinarily subtle and complex properties of behavior which may be traced to subtle and complex features of the contingencies of reinforcement which prevail in the environment" (Skinner, 1968). Even when the goals cannot be easily or precisely defined, as is sometimes the case in complex organizations, operant conditioning has been demonstrated as being useful for training. Essential to this fact, is the notion that an operant approach is not simply a technique. It is an entire, wholistic way of viewing learning, or behavior change. All behavior is seen as occurring in an environment, and the two are inseparable. It seems unlikely that either physical or social environments can be fully understood independent of each other (Moos, 1974). The operant approach seeks to precisely define the functional contingencies under which certain behaviors occur.

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INFORMATION PROCESSING IN ADULT LEARNERS

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A Rationale for Instruction

Information-processing is but one of many ways of viewing learning and teaching. Other sources of models or theories include behaviorism, social learning theories of modeling, mathematical models, and the personal or humanistic orientations. Each source makes its contribution to understanding the classroom situation and, in one form or another, most views are represented at this conference.

While my presentation shall be biased in favor of information-processing it is my belief that, in the light of the "state of the art," a complete model of teaching ultimately must be based on some combination of the contributions made by all of these models. It is true that teaching can proceed and can be governed by diligent application of any one orientation. But, undeniably, one method will be more successful than another for certain outcomes. The question of which one or which combinations to use must be answered in terms of efficiency.

There is no one information-processing model. Some such as Ausubel's or Bruner's are relatively broad in scope and attempt to cover most of the problems that occur in teaching and learning. Others deal with a specific aspect of thinking such as memory or transfer. And still others such as Piaget's deal with development of processing ability. Some are rather

free-flowing descriptions, while, others, such as computer-simulation attempt precise step-by-step analogues or models of thought processes. It seems to me that most theories in psychology whether psychoanalytic, Gestalt, behavioristic, or phenomenological have assumed implicitly, at the least, that some processing takes place.

Some Illustrations of Information-Processing

A simple analysis of a few situations may be helpful to introduce the notion of information-processing as it might appear in some simple instructional situations. They are as follows:

1. When free recalling a list of words the student recalls the list in an organized way but different from the way it was organized by the instructor. The student changed the way the information was organized.

2. A student gives the letter A the same interpretation, i.e., he calls it "A," whether it is printed in Gothic, Roman, or Old English; whether it is mutilated, printed, or handwritten; or whether it is lower-case, capitalized, or shaded. Part of the interpretation is based on objective perceptual features and part, of course, depends on the context in which these features occur. But regardless of which factors are important, it is apparent that the reader changes the original information to conform to his expectations.

3. A student can understand a spoken message even though many specific words were slurred so as to be incomprehensible, others went unheard, and still others may have been omitted. The message is understood because he added information to the original communication as it was transmitted.

4. In some experiments, the interpretation of the brightness of an ambiguous figure depends on how the figure is viewed. In one context the figure may be "seen" as very white; within another context the perceiver changes his interpretation in terms of his expectations and says it is gray (Festinger, Caren, and Rivers, 1970). In this case, the perceiver changes his interpretation depending on his expectations which in turn are based on context.

5. A student is asked to repeat back a relatively long sentence verbatim. In doing so he inevitably paraphrases it. If he is a bilingual with English as a second language he may insert, without awareness, a couple of words in his first language. He has changed the expression, i.e., the surface structure, of the message.

Upon analysis these examples can be seen as representing very different events: perceiving, interpreting, comprehending, and retrieving. On the other hand there are some regularities among them. If you are a traditional behaviorist you would say that the similarities are composed of clearly defined stimuli and responses . . . inputs and outputs . . . and then you might proceed to explain the behavior in the light of these facets alone by incorporating other kinds of learning phenomenon such as interference of generalization. However, it is apparent that more is involved in these illustrations than simple, mechanical reactions tc stimuli. In each the learner is recycling the information he has received or is using. As the information is processed in different ways some unique quality of the learner's own knowledge and experience is contributed to the input.

Meaningful Learning

Ausubel's definition of meaningful verbal learning seems especially suited to initiate a rationale for instruction based on information-processing. He says it involves two basic functions: perception and cognition. "Perception involves an immediate content of awareness before the intervention of . . . complex cognitive processes." Cognition involves such processes as relating the new material to relevant aspects of existing cognitive structure . . ." (Ausubel, 1968, p. 5).

The full implications of this definition may not be immediately apparent. First, it means that the learner becomes aware of, and attends to, selected features of the situation, i.e., there is selection of information . . . a first step in processing. You can't attend to all of the information in a situation; there is too much of it. Some selection has to be made in terms of its relevancy to your purposes at a given point in the stream of behavior. Second, it suggests that the information selected is further processed at the time the material is stored, i.e., the information is coded or transformed. The learner might code the material in 1:1 relationships, e.g., "This object is called a stone" or "I took the examination at 9:00 a.m." This kind of learning takes place in the rote learning of isolated facts. Or the learner might code the new information in 1:N relationships as is characteristically the case in concept learning. New information might be linked to concepts already known without changing them, or new information might be linked to the old in order to arrive at refinements of, or even drastic changes in, concepts the learner already has, as is the case in drawing inferences. Third, Ausubel's definition includes whatever the person does at the time

information is recalled or retrieved as, for example, when the learner takes a test, applies the information he has stored to a new situation, or uses that information to solve problems.

Summary

This brief overview has indicated that information processing involves:

a) Prior learning factors such as the person's knowledge, his sets or dispositions, his attention to the information presented to him, and whatever instructions are given to him.

b) Events that occur during learning such as the way the material is presented and the strategies the person uses to relate new information to existing knowledge.

c) Events that occur subsequent to learning including the cognitive organization or reorganization of information as it is stored in memory, the recall or retrieval of information, and the use of information in transfer or problem-solving.

Knowledge Structures and Information-Processing in Adults

There is an obvious fact about the adult learner which makes him different from the younger learner in all of these aspects, that is the adult learner has had longer time and greater opportunities for more experience than has the child. However, this fact alone is an insufficient guide for the instructor of adults. What needs to be understood is how that experience has affected the adults' ability to perceive, process, and use information. The basic premise, then, is that the adult's cumulative experience has in some way influenced his information-processing.

By the time the learner is an adult he has had more time and more opportunities for accumulating information. Much of this information is common across all members of the knowledge community; they all have basic concepts more or less unique to that community which permit communication about the majority of events in the culture. But some unknown portion of this information is determined by the person's unique experience within the culture and accounts for individual differences in knowledge structures.

Compared to a child, the adult has relatively more information and that information is organized in a highly interconnected data base. While all adults are assumed to have knowledge structures there will, of course, be vast individual differences in the knowledge acquired by a particular individual and in the degree to which that knowledge has been organized.

Cell Assemblies and Phase Sequences

The knowledge structure makes a big difference between how a child learns and how the adult learns. For the child, each new concept must be "built from scratch," so to speak. D. O. Hebb called these basic acquisitions cell assemblies, meaning that these are the cells, that is, elements or building blocks, of the more structured knowledge still to come. Knowledge in childhood is accumulated by bits, though some of it, as Piaget notes, is in the form of patterns. A great deal of factual information is probably learned in the form of independent events though certainly not exclusively so. The achievement of adult understanding takes place slowly as one's knowledge is gradually elaborated with new experiences, with new features to add to knowledge already acquired,

and with the acquisition of new principles or relations within and among classes of information (i.e., concepts).

Initially, information in the form of concepts are partially or vaguely defined. They become broadened by adding attributes to them in the context of experience. They also become broadened by relating them to other concepts, i.e., by making new classifications, by making multiple-classifications, by forming principles, or by forming theories. Once the fundamental elements or cell assemblies have been acquired, as they presumably have with the adult, then learning consists of putting them into different combinations. Hebb called these combinations "phase sequences."

The Adult Learner's Task

At this point it can be seen that information-processing models imply that the adult learner's task is quite unlike that of the child's. The adult learner has a set of concepts which he can put together in different ways to acquire new knowledge or even to generate new knowledge as does an inventor or creative artist. New ideas can be learned by analogy to what the learner already knows. Or, a new idea can be fitted into some part of the already existing cognitive structure. In either case, relative to that of the child, the adult learner needs to be more concerned with relating new material to what he already knows than with acquiring the elements of knowledge. Once the right relationship has been established then the new idea takes its place in the whole of the individual's past experience. This experience is then brought to bear on the interpretation and understanding of new events.

The adult's highly integrated knowledge structure facilitates learning in the sense that the adult rarely if ever meets anything that is totally new and that somehow cannot be related to something already learned or experienced in the past. The child's knowledge structure is much less differentiated and may even contain missing elements. Furthermore, as Piaget and others, such as Kohlberg, suggest the experience of the child is coded in different forms such as motor, and ikonic rather than symbolic. Since much of what the adult knows is codified in the symbolic form of language Ausubel suggests that adult learning is most efficiently facilitated by the use of reception learning through verbal communication. This view also seems to be in the "lore" of education for adults where it can be seen that lectures, conferences, seminars, discussions and the like are used far and above any other teaching technique. While it is true that a major activity in all elementary and secondary classes is also talk there is evidence from studies by Olson ( ) that (a) language may not be the best means for efficient learning in very young children or (b) that when language is used with young children it serves a different function than when used with adults.

Possible Disadvantages of Structured Knowledge

Although I have spoken of the advantages of the highly coded and highly structured information stored by the adult, there is at least one disadvantage that needs to be mentioned. Wherever we have a highly structured interdependent set of relations, whether it is a living organism or a beauracracy, it resists change. When a child, with somewhat less structured knowledge or at least structured in a different way than that of the adult, confronts a new experience or idea he can be persuaded to

accept it . . . for he has little basis for determining whether the new experience is a contradiction. On the other hand, an adult confronted with information discrepant or contradictory to his own is more likely to reject it than to change or modify his beliefs or meaning. It often may take considerable debate to convince such an individual even of the most "obvious" facts. You might say that there is "hardening of the categories." On occasion adults do seem more ready to accept suggestion and recommendations than youngsters. When this observation is made I suspect it is under special circumstances (e.g., classroom in college) and with special groups (e.g., male or female students). Nevertheless, I know of no study which has compared the suggestability of adults and children directly.

Summary of Adult Knowledge Structures

We should note that no two people's cognitive structures are going to be the same. Meaning and understanding are determined by whatever information is received, by the way that information is interpreted, by the way it is stored, and by the way it is reorganized on the occasion when it is to be used. Although the basic machinery for processing is, in all essential aspects, the same for all adults, the outcomes of that processing will be quite different, because of the raw materials used (i.e., what part of the external evidence or input is selected); how the material was processed, i.e., whether it was learned by rote or for understanding; and how the material was subsequently employed that is, whether the material was used in drawing inferences, making deductions, or other applications. Even very small differences in one's experience can result in large individual differences, even though the basic machinery is

identical for all. With all of these influences operating, by the time the adult years are reached there will be no likelihood that two individuals will have the identical knowledge structures even in the most controlled environment.

Motivation and Information-Processing

The kinds of motivations considered in information-processing models depart considerably from those described in early theories which emphasized reduction of biological needs. Studies of curiosity, exploration, and manipulation drives have led to the realization that children and adults are motivated in learning situations by the drive for competence, by epistemic curiosity, and by a desire to reduce uncertainty. All of these, and there are others similar to them, have in common the assumption that they lead to knowledge-seeking activities such as identifying alternative hypotheses, seeking more information, or using new resources . . . all of which are desirable characteristics of adults as learners.

Whether such motivations are innate or acquired or whether they are stimulated by deprivation and reduced by satiation is of little pragmatic importance, although the answers to such questions may have theoretical importance. What is important about these sources of motivations is that they are largely cognitive; that in one way or another they involve processing activities. In Maslow's terms they are also positive or being-needs in the sense that they lead to behaviors which are constructive rather than simply to satisfy a deficit. Thus, for example, the assumptions about the need for competence imply that people gain satisfaction upon completion of challenging tasks. Interest in playing a game

wanes, for child and adult alike, if and when it is mastered. On the other hand, some games (like bridge and chess) can be lifetime occupations for these who find each sitting a measure of mastery. While both children and adults have a need for competence (or some variation of it such as the need for exploration or manipulation) the difference is a matter of what is considered challenging; so the difference is a matter of complexity and level of difficulty. For the adult, the task found challenging by the child may often be only child's play . . . it might be fun doing it for awhile, but you probably wouldn't spend a lifetime at it. For the child, the task found challenging by the adult is often out of the child's reach. In any case the outcome of the need for competence is exploration for better ways of doing things or for more knowledge.

Epistemic Curiosity

Berlyne calls this quest for knowledge, "epistemic curiosity." He also describes how such motivations can be engendered in learners, and his suggestions appear to be especially suited to adult learners. Epistemic curiosity is induced by dissonance or discrepancy between two ideas or, less often between an idea and an action. The evidence suggests that mild discrepancy can be and is motivating but in a real sense the learner is "turned off" by discrepancies which are too large. Thus, one might be motivated to go from Brahms to Beethoven to Bach; but for the novice at music appreciation the jump from Beethoven to Shostokovitch may be "too much."

An example of the way epistemic curiosity can be motivating is the dissonance experienced by the purchaser of a car. In these days, the owner of a brand new car with a 450 horsepower engine might experience

some dissonance between his action of having purchased this car and his idea of gasoline economy. If he does experience dissonance, a number of behaviors may be evoked to reduce the discrepancy. He will probably behave in a way to seek justification from friends or other sources for having purchased a "gas guzzler." He will select stimuli that will support his action and avoid those which will aggravate the discrepancy. He might reduce or deny the arguments for purchasing an economical car. Whatever he does, it is clear that everything is taking place at the cognitive level. Information is pitted against other information within the individual's head. The motivation is due almost entirely to the way the information was processed. Had the purchaser of the car made the same decision in an earlier era there would have been little consideration of gasoline economy and, in our example, no cognitive dissonance.

Stimulating the Learner Through Cognitive Motivation

The practical aspect of our understanding about competence and discrepancy is that these sources of motivations underly a very simple and easily used motivating device . . . i.e., the induction of cognitive conflict, discrepancy, or uncertainty by provocative demonstrations and, in particular, by the use of questions. Critical in their use is the requirement that demonstrations and questions should be designed to produce genuine conflict. If not they will not be taken seriously by the learner. In order to meet this requirement the knowledge structures of the adult learner must be considered . . . one man's answer is often another man's question.

Properly used a question or other technique for inducing epistemic curiosity will initiate and control the course of a search for knowledge,

that is, they will lead the learner to seek certain kinds of knowledge. Berlyne (1960, p. 290) uses the example of the question "What crops do some ants cultivate in underground farms?" For some people this question creates a discrepancy since we do not ordinarily think of insects engaging in agriculture. But, you can't keep people from thinking . . . processing information . . . and if they know anything about entomology they eventually will come up with the answer (which is related to fungus growing ants). If they know nothing about entomology they will try other responses and if they are sincerely motivated they will seek out other sources until they find an answer.

To illustrate epistemic curiosity, I frequently tell my students about the existence of a 50,000 word book written without the letter "E." Since this fact is discrepant with the common knowledge that the letter E is the most frequently used letter of the alphabet it arouses the curiosity of at least 80% of the class. They begin to speculate, ask questions, turn to one another, ask me for the answer, and so on. One student told me that she spent more than a total of 40 hours during the term in the library looking for the book! The instructor's task in finding such questions, or making and using conflict producing statements or demonstrations obviously requires that he consider the subject matter of a course and what the learner already knows. If the learner knows about the book written without the letter "E" that fact has no motivational appeal.

Individual Differences in Cognitive Motivation

Salomon and Seiber ( ) have shown that the learner's degree of uncertainty can be reliably measured as an individual difference variable. Thus, some learners, probably because of their socialization histories,

are characteristically certain about their own views or responses to questions. If so, they tend not to seek information and not to consider alternatives. People who are always certain, even when they are wrong, "do not know that they do not know." This "Archie Bunker" type of behavior has been called "secondary ignorance." Some degree of uncertainty is essential for all facets of problem-solving including information seeking, inquisitiveness, and even problem-finding and so is an essential feature of information-processing.

Goal Direction from Cognitive Motivation

Discrepancy has another function in information-processing aside from goading the learner to cognitive action . . . it defines the goal and therefore directs the learner's cognitive activity. As it is built into programs for computer simulation of human problem-solving, discrepancy is defined as the difference between the problem situation . . . where you are precisely at this moment . . . in relation to the solution situation . . . where you will be precisely when the solution is found. Both of these are essential in problem-solving; the sources of the discrepancy must be known precisely by the problem-solver if the problem is to be solved. But, more importantly, for the point that I want to make is that the discrepancy not only provides the "go" signal to begin a search for the solution but it guides and directs all of the processing that takes place. It determines which sub-goals must be established, the kind of information needed, the kinds of relationships that are developed between ideas, and the evaluations of progress toward the goal. It even provides the "stop" signal; when there is no discrepancy . . . i.e., when the problem-situation and the solution situation are identical . . . the learner redirects his energies elsewhere.

Summary of Cognitive Motivation

From these illustrations it can be seen that motivation from an information-processing view is a mental phenomenon taking into consideration the cognitions, expectations, and affective properties of the person's interpretations. It is initiated by relating ideas, it goads the learner to seek ideas, it directs the learner to seek certain kinds of ideas, and it leads to processing the ideas so as to relate them in unique ways and to resolve the discrepancy. Even the "stop" signal like the "go" signal is the result of internal activity.

Information-Processing and Organization of Instructional Materials

How should instructional materials be organized according to an information-processing model? Any subject is itself a unique organization of knowledge. In a real sense, a given discipline is the outgrowth of man's processing activities regarding one view of the world. Thus, the physicist, mathematician, chemist, biologist, and social scientist can all be concerned with exactly the same environmental event. Let's say, for example, that they are all concerned with "man." You can easily see that each views man in a different way, i.e., each discipline uses different concepts for describing "man."

Functions of Organizing Instructional Materials

Even when two disciplines employ the same concepts, the relationships among the concepts may differ between disciplines. So complicated is this relationship that a hierarchy consisting of cross-disciplinary organizations have been achieved by only a few individuals and then only partially so. Nevertheless, one of the first guiding principles for

presenting course materials is that some organization of concepts, i.e., system, comparable to that employed within the discipline being taught ought to be developed and used by each learner. These systems have emerged out of a long tradition of experience and thus can be used as a "best estimate" of a useful basis for organizing materials. The assumption here is that as the student learns the processes and ideas within the discipline he processes these as his own. Several modern curricula in the sciences and mathematics have been based on this assumption . . . perhaps mistakenly so, primarily because it was the sole criterion used. But organization is considered so important that many instructors of adults with whom I have spoken on an informal basis feel that their unique contribution was primarily one of providing a different organization of the field than the one presented in the textbook and then allowing the learners to formulate their own paradigm or organization.

Advance Organizers

Other functions of organizing instructional materials will include the linking of new information to what the learner already knows. Although only the learner can do that there are some things the teacher can do to facilitate this process. Ausubel, for example, advocates the use of advance organizers to help link new concepts to already known ones. These are composed of key ideas in advance of the main text organized in a way which helps the learner understand the relation of what is known to what is to be learned. The advance organizer may introduce the student to concepts to be learned . . . called an expository organizer; it may help him to relate the new material in parallel to material he already knows . . . called a comparative organizer; it may introduce him to the way the

material is organized . . . called an hierarchical organizer; it may introduce him to the history of the material . . . called an historical organizer; or in any number of other ways. Each way of organizing can be assumed to have specific functions, and the assumptions can be put to empirical test. For example, if you present material which is relatively familiar, a comparative advance organizer might be used. This means that a parallel is made between the fundamental concepts of the new material and of information hypothesized to exist already in the learner's knowledge structure. To illustrate further, if the learner already knows that one learning theory is structured around the anchoring concepts of motivation, the role of practice, retention, and transfer then these anchors can be used to introduce him to the distinctions he must seek in a new theory to be learned. If the learner is to identify the main ideas of Buddhism, a parallel can be drawn in the advance organizer between what he already knows of the concepts of death, sin, life, and so on in Christianity and what he is to learn about these concepts in the Buddhist religion.

Where the material is less familiar to the learner, Ausubel advocates the use of expository organizers. These point to potentially helpful channels on which the learner should focus his attention. More formally, they introduce him to the main superordinate ideas and their relation to each other in more or less familiar terms. We should recognize that the advance organizer is not the same as an overview or summary which is typically at the same level of abstraction as the main body of the material to be learned. Rather, the advance organizer is characterized as a set of concepts interrelated with other concepts in a way to capitalize on the learner's present state of readiness and presented in a way to enhance his

readiness further. This implies that instructors, as facilitators of learning, need to learn a great deal formally, through research, and informally, through observation of our own students, on what the learner already knows.

The design of organizers is a demanding task since a variety of organizers will typically be required for teaching the same material to different groups of learners. In particular, the kind of organizer one uses will depend on the subject matter to be taught, on the instructional objectives, and on the learners' backgrounds, especially as it relates to the subject matter being taught. The important feature about advance organizers or any other instructional treatment for that matter is what they cause the learner to do.

Knowledge Structures and Learner Readiness

Gagne's view of learning points to the readiness of the learner in another way. In brief, and omitting some detail, the instructor, from Gagne's view first makes a task analysis based on a hierarchy of learning. If the instructional target was to teach the learner how to solve one kind of engineering problem, that would be the starting point of the task analysis. Then we would analyze, step by step, the prerequisites for achieving that objective: Thus, prerequisite to problem-solving would be principles. Among the principles might be the principle of momentum. Then you would ask, "what must the learner know before he can understand momentum?" Prerequisite to understanding the principle momentum would be an understanding of concepts, in the case of our example . . . the concepts of mass, multiplication, and velocity since momentum is the product of mass times velocity. Further analyses would be made in terms of

discriminations that must be made and terms that must be employed. Gagne suggests ways this can be done systematically. Once the analysis is made, from the top down, teaching proceeds in reverse order, from the bottom up. Thus, the instructor would teach the concepts first, then the principles, and finally the applications.

There appears to be another way in which instructors provide for readiness of the learner . . . in the sense of linking the material to what the learner knows. It is common knowledge that a problem experienced by some instructors is "getting down to the level of the students." This is essentially the result of an instructor transmitting a communication from one knowledge structure to a receiver with another knowledge structure. To teach, in this sense, means to expose learners to examples drawn from their experience at each of the levels analyzed. If this point goes unrecognized each feels that "never the twain shall meet." When an impasse is reached students in college, at least, will get together in their own informal seminars to discuss the material, or instructors may allow them to discuss the material in their own terms in class. When these procedures work I strongly suspect it is because they provide for making the material correspond more closely to what the students know. This may be one of the advantages of the so-called discovery method, and of the group discussion method, although for some reason the point has been neglected in educational research and I know of no evidence for or against this hypothesis.

The Effect of Context on Information-Processing

Another focus of information-processing is on the organization of the instructional material itself. Consideration of the context in which the material is embedded becomes essential if the instructor is to be a

facilitator of comprehension. If you say to an individual as Bransford and his colleagues did in one of their studies, "The note was sour because the seams broke" the listener might say, "What are you talking about?" He looks for a label, i.e., a context within which to put your comment so it will make sense. When you answer his question with "I am talking about bagpipes," then the statement makes sense. Early demonstrations on perception by the Gestalt psychologists showed that pictures might be ambiguous where there was no clear figure/ground relation. One such picture, when viewed in one way is the picture of an old lady and when viewed in another it is a picture of a young girl. However, one can control, to some extent at least, how this picture is processed by varying context: when an unambiguous picture of the young woman in the picture is presented first the ambiguous picture is seen as a young woman; when an unambiguous picture of the old woman is shown first the ambiguous picture is seen as an old woman.

There is a classic experiment in social psychology on prestige effects which also demonstrates how context can affect processing. The experimenters presented a little known passage from the constitution to two groups of subjects; in one group the authorship was attributed to Lenin and in the other group the authorship was attributed to Franklin. The first group found the message in the passage unacceptable; the second group found it acceptable. It was exactly the same message in both instances, but clearly the context changed the outcome . . . the way it was comprehended.

In general, providing strong contexts such as by titles or labels before otherwise ambiguous textual material greatly enhances its

comprehension and recall; giving the title after has no effect on comprehension. Without appropriate contexts the student spends his time searching for a context. It may be an appropriate one when he finds it, but it may not conform to the course objectives. One context provides an anchor around which the learner can generate the meaning of a message; with another context he may generate quite a different meaning.

Organizing instructional materials requires that the instructor place the material into units, i.e., into coherent groups of facts, events, or other elements. The way the material is organized can affect how the material is learned. In a study by Bower and Winzenz (1969), for example, strings of digits were presented the subjects in this way:

First series: (18) (429) (3617) (5) (47)

Second series: (184) (2) (936) (1754) (7)

Note that the learning material is exactly the same in both instances. If only the material itself, i.e., isolated facts, was important and not the way it was processed as a result of the organization we would expect that having learned the first series might transfer either negatively or positively to the learning of the second series. (One could provide reasons for either position, but the arguments are not germane to the point being made here.) The finding was the learning the first series had no effect, either positive or negative, on learning the second series. The second series was learned as though it was an entirely new series. We can assume that changing the structure, i.e., organization, of the learning materials an entirely new task was presented to the learner, and he treated it accordingly. The groups of digits were approached as the units to be learned rather than the digits themselves. Thus, external

organization of material by the instructor does influence what the learner will do with the material. But, in the final analysis, the way instructional material is processed by the learner determines the meaning he derives from it.

Memory and Information Processing

The way material is recoded affects what is remembered. Miller pointed this out many years ago at an address to the American Sociological Association and published in a now classic article with the title "The magic number seven plus or minus two." One of the points made in that article is that the immediate memory span is about 5 to 9 bits of information. Without going into the technicalities of information theory, it is sufficient to say that bits refer to discrete and unrelated pieces of information. However, everyday experience shows that we can and do remember more than the proverbial 7 bits, and some showmen can recall as many as 40 or 50 names. The reason for this is that the bits become chunked or organized into clusters which, then function as units. If we read TTIKNSE we have to remember 7 bits, but if we recode it, i.e., organize it into KITTENS we have only to remember one bit.

Even if organizing only affected the limits of the memory span it would be a critical reason why material must be organized. Organization is helpful in chunking the material into meaningful units. Without these chunks, memory can be easily overloaded or swamped leaving little or no opportunity for the learner to process it for himself. This is another of the ways then that knowledge of information-processing can make the instructor aware of factors that contribute to efficiency of instruction.

However, most of the evidence for memory deficits in adults implies that the deficit is in the retrieval function rather than in the storage or memory function itself. This deficit, too, appears to be more related to retrieval that depends upon organizational processes rather than on short-term or immediate memory. "As the to-be-recalled material becomes more amenable to organization there is a greater decrement in recall performance with increasing age." The adult learner seems to have two problems in this respect: one is the quantity or quality of information contained in a given organizational category of material; the other is finding an appropriate retrieval plan for locating the information in memory. Whatever the reason for retrieval deficits it appears first that adults can be helped if instructors insure an organization of materials that can be employed as an adequate retrieval plan. Second, the instructor can prevent "swamping" by limiting the amount of material to be assimilated by the adult learner. Third, the adult learner might be well-advised to listen and pay attention rather than to take notes since it has been found that for people with poor short-term memories taking notes interferes with what is recalled. Fourth, it might be profitable to spend some time in instruction on the process of retrieval. At all educational levels we emphasize storage . . . practice, rehearsal, review, meaningful learning and the like . . . while we require learners to retrieve on tests, applications, etc. we tend not to provide systematic instruction on methods of retrieving information . . . perhaps this is because we are only now beginning to understand what is involved in retrieval.

The implementation of these procedures would have the added advantage of preventing the adult learner from feeling threatened by

overwhelming amounts of material to assimilate. For all learners, the opportunities for organizing and structuring the material, both while learning and for potential use in retrieval, will doubtlessly enhance not only the retrievability of the information but also its meaningfulness and applicability to a range of situations.

EXPECTANCY THEORY APPLIED TO ADULT LEARNING

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Introduction

The title of this paper promises some comments, if we are fortunate, some insights about the psychological phenomenon of adult learning. For our purposes let us assume that when we talk about adult learning, we mean learning as a general psychological phenomenon, even though it is possible to argue that adult learning includes some special parameters or attributes which would justify separating the concept of adult learning from the concept of learning in general. In any case, this distinction takes on less importance within the arguments presented in this paper.

If we want to talk about learning then, why would we want to use expectancy theory as an explanatory model of learning, when expectancy theories deal with the concept of motivation. Of course, even though we use the term "learning" and "motivation" as identifying separate concepts, in practice unfortunately the difference between the meaning of these two terms has not been all too clear. The history of psychology clearly shows that the problems related to motivation, i.e. what factors explain the direction, vigor, and persistence of people's actions, are

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[1]The helpful comments and suggestions of James L. Farr are gratefully acknowledged.

closely tied to the problems related to learning, i.e. how do people's actions change as a result of a variety of experiences, training, practice, etc.

When we talk about learning, we are interested in understanding the process by which people acquire, retain and change their behaviors as a consequence of what they have experienced in the past. Thus learning generally focuses on historical analyses of peoples' experiences and behaviors. On the other hand, when our interest is directed toward motivation, we seek understanding of the contemporaneous psychological factors which define the direction vigor, and persistence of people's current behaviors. Thus motivation implies an ahistorical analysis of people's actions.

Although we have now in some fashion distinguished learning from motivation, the interrelationship between the two psychological concepts is immediately apparent. The effects of learning, of past experiences and past actions, of things remembered and things forgotten, are important considerations when motivation is the subject of our investigations. But the effects of prior experiences now become only one of many factors which combine to define the instigation, direction, and persistence of people's current behaviors. Similarly, the motivational factors, for example, the effort a person expends, have a bearing on what effects training and practice have on the extent to which certain behaviors are acquired, retained, or forgotten.

In summary then, we propose to use a theory of motivation, expectancy theory, as a means of providing a theoretical model to help understand some important issues in a learning situation. But because

we are using a motivation theory and related research, the discussion will center on the factors which may have a bearing on how much effort adult learners exert, in which direction they might exert their efforts, and the degree to which they achieve or miss the objectives toward which their efforts are exerted.

Overview of Expectancy Theory

To a large extent students of motivation have viewed the motivated organism in rather mechanistic ways. A legacy from the early research with animal subjects and the school of behaviorism, people were assumed to be "pushed," "pulled," or "activated" by a variety of mechanisms and stimulus forces. For example, we find analyses of motivated behavior in terms of conditioning processes which link behavior to certain internal or external stimulus forces, or we can find a variety of explanatory schemes which define motivated behavior in terms of an ever changing set of drives, needs, motives, or attitudes. However, many of these approaches have largely ignored or left unspecified some of the most unique attributes of human nature, the (perhaps limited, but nevertheless important) cognitive processes and human rationality. Expectancy theorists beginning with Tolman (1932) and Lewin (1935) and more recently Atkinson (1958), Vroom (1964) and Rotter (1966) have attempted to clarify the role of cognitive processes within the concept of motivation.

Although a number of different expectancy theories and variations of them exist, they all share a number of basic explanatory elements and assumptions, which we would like to briefly review. The expectancy

model to be reviewed here (Dachler & Mobley, 1973) is based on the assumption that in principle motivation can be viewed within a decision framework. In other words, we could view an adult student's performance level as a result of a choice he makes. The decision process involves choosing from among different potential action alternatives or performance levels (e.g. different course letter grades, number of course projects completed and judged to be satisfactory, different curriculae, different courses, etc.) that level of performance or action alternative which, on the basis of various beliefs and feelings, is thought to be most useful for a given student. Motivation then, is represented by the effort a student exerts to reach the performance level which he has judged to be most useful among the various relevant performance alternatives available to him.

This present view of motivation within a learning situation, thus assumes that students can and do make intentional choices among different possible learning outcomes. Unconscious processes, although potentially relevant, are not dealt with directly within this framework. However, within the domain of conscious, volitional behavior, expectancy theory attempts to explicate some of the processes by which people choose among relevant alternatives.

Figure 1 provides an illustration of the first important explanatory term within expectancy theory. In this example we assume that for a given student, his efforts can potentially result in three possible performance outcomes: level A, level B, and level C. What then, according to expectancy theory, determines toward which performance level a student exerts effort? The first important component

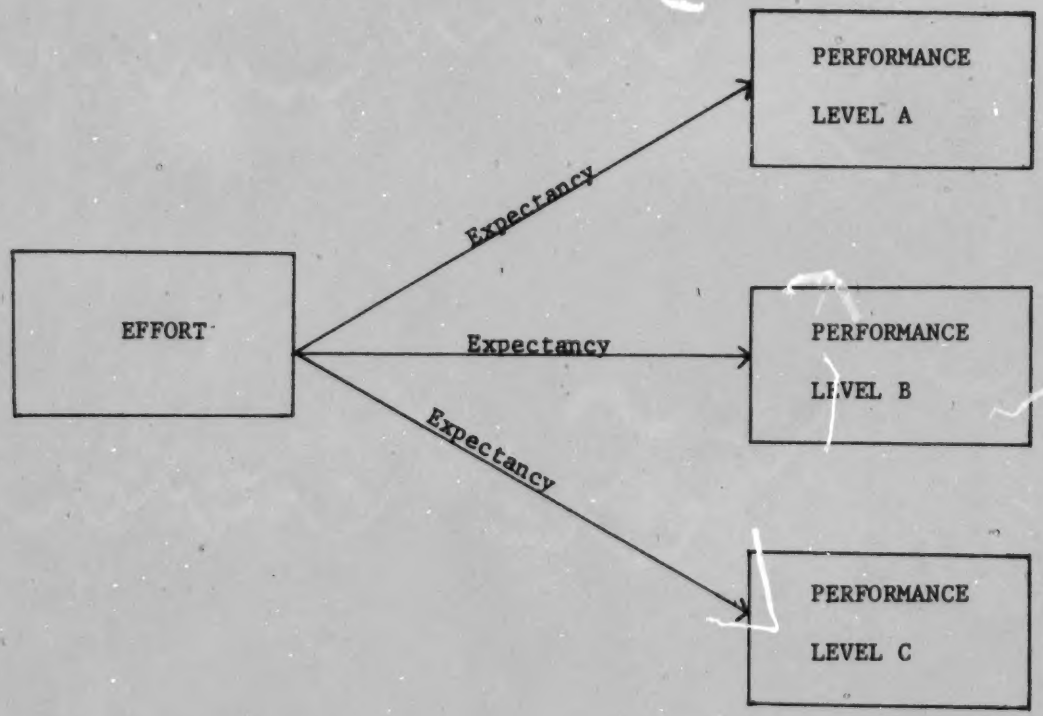

FIGURE 1 MODEL OF EXPECTANCY

in the answer to this question is the term expectancy. Expectancy refers to a subjectively perceived probability that, if he really tried our student can in fact reach or perform at a given level of performance. Thus, if the performance levels differ in difficulty one would expect that a student with a fixed amount of ability and in similar circumstances would see less of a chance of reaching the most difficult level of performance than reaching the least difficult performance level. Even if the different performance levels were objectively equally difficult to perform at, the perceived chance of reaching level A might still be less likely than reaching level B, for example, because there are situational constraints which reduce the likelihood of reaching level A over level B. In any case, expectancy enters into the decision process by the hypothesis that, other factors being equal, the lower the perceived chances of attaining a given level of performance, the less likely a student will be to exert effort (be motivated) to perform at that level.

Figure 2 illustrates the remaining explanatory terms within expectancy theory. The first important term in this Figure is the utility or attraction of a particular level of performance. Expectancy theory assumes that, all other things being equal, a person would be motivated to achieve or exert effort toward the level of performance which for him has the most usefulness (utility) or attraction. The utility or attraction of a given level of performance is hypothesized to be a results of the combination of two factors. One is the degree to which a given level of performance is perceived to be instrumental in attaining certain consequences or outcomes. Thus instrumentalities

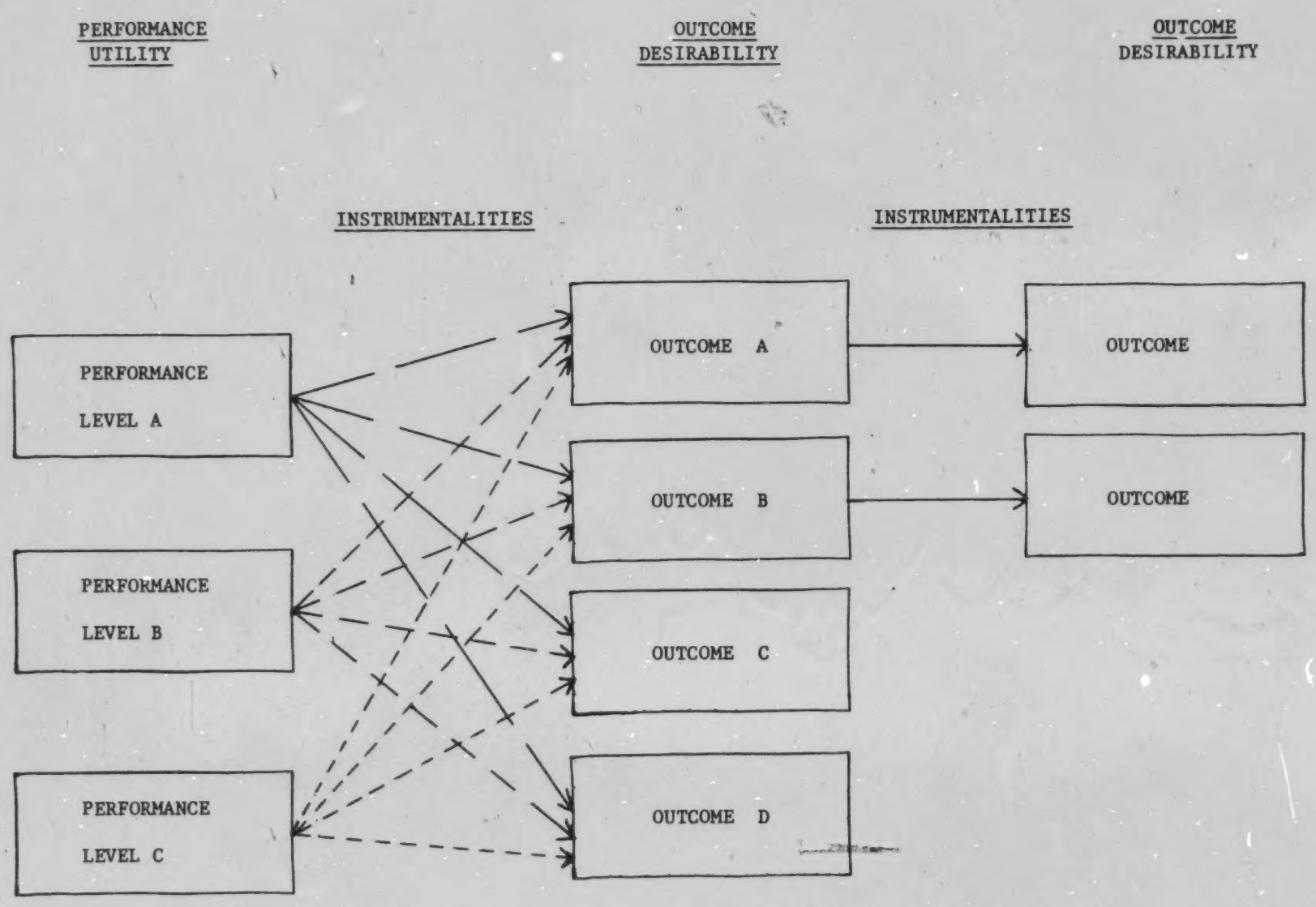

FIGURE 2 - MODEL OF PERFORMANCE UTILITY, INSTRUMENTALITY, AND OUTCOME DESIRABILITY

refer to perceived chances that a given level of performance will lead to various outcomes or consequences. The second factor which enters into the utility of a given performance level is the perceived desirability of the various consequences or outcomes. The utility of each of the three performance levels in our illustrations then refers to the degree to which each performance level is perceived to be instrumental in achieving highly desirable outcomes or consequences and is perceived to be instrumental in avoiding highly undesirable outcomes. If a performance level is seen to have a high instrumentality for desirable outcomes, the utility of that performance level is increased. On the other hand if that same performance level is seen to have high instrumentalities for undesirable outcomes, the utility of that performance level would decrease.

Finally, if this performance level is perceived to have no instrumentality for desirable outcomes the utility of that performance level would decrease. And if that performance level were seen to have no instrumentality for undesirable outcomes, its utility would increase. Because of these arguments expectancy theory postulates that utility of a given performance level is defined by taking all of the instrumentalities of that performance level for all of the relevant consequences, multiplying each instrumentality by the corresponding outcome desirability and then summing the resulting products across all outcomes relevant to that level of performance. The result is an index of utility or attraction for that performance level. The same procedure is followed for each of the potential performance levels.

It should be noted that in Figure 2 the desirabilities of outcomes A and B are a result of their instrumentality for yet other outcomes and the desirability of those outcomes. In other words, some outcomes derive their desirability in terms of their instrumentality of reaching other outcomes. For example, if outcome A represented a promotion in the adult learner's place of work, the desirability of the consequence "Promotion" is defined by its instrumentality for outcomes such as a pay raise, recognition from friends, and increased pressure at work. On the other hand, some outcomes, such as outcomes C and D in Figure 2 are sought as ends in themselves. Thus outcome C might refer to an interesting experience in the learning situation, which is desirable for its own sake, not necessarily because it leads to some other desirable outcome.

Figure 3 illustrates the total decision process described by expectancy theory. Going from left to right, the outcome desirabilities combine with the instrumentalities to result in a perceived utility or attractiveness for <u>each</u> performance level. We also have an expectancy, the perceived likelihood of reaching a level of performance, for each level of performance. The combination of the utility of a given level of performance with the expectancy of that level of performance provides an index of motivation which we call the expected utility of that level of performance. Thus, if a level of performance has a high utility for a given student, but he perceives a low probability of reaching that performance level one would not expect him to exert much effort in trying to reach that performance level. Similarly, if a student had a high expectancy of reaching a given performance level, but that

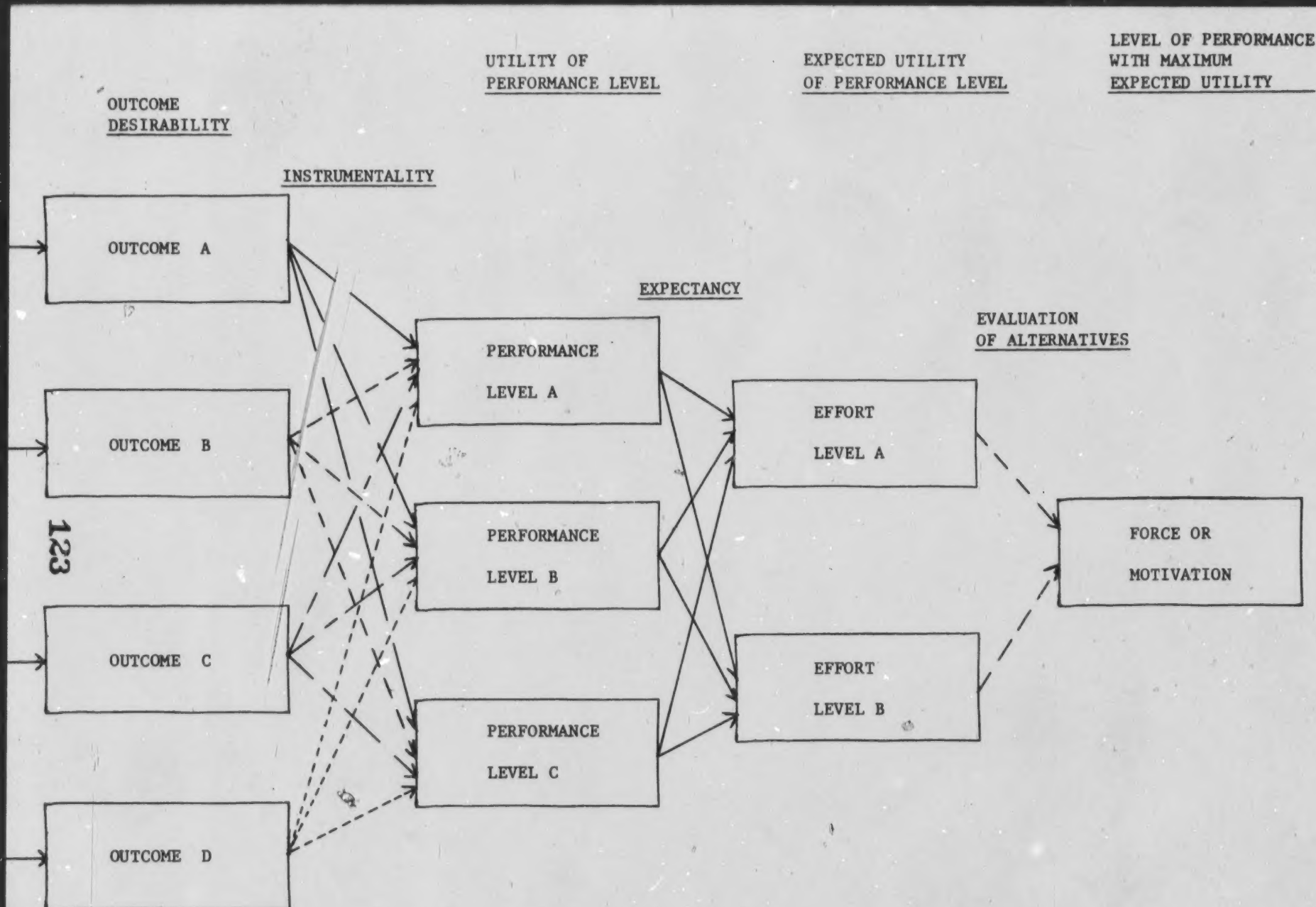

FIGURE 3 - EXPECTANCY MODEL OF MOTIVATION

performance level did not have high utility for him, the result would be a low expected utility and therefore little effort toward reaching that performance level. So, just like instrumentalities are multiplied with outcome desirabilities to define the utility of a level of performance, expectancy for a level of performance is multiplied with the utility of that performance level to result in an index of motivation or force toward that performance level. In other words, to be motivated to work at a particular level of performance, a student must not only feel that he can actually achieve that level of performance (high expectancy), but that this level of performance is also an attractive or useful one (high utility).

We indicated earlier in the paper that expectancy theory views motivation as a decision process. If we make the assumption (and it is obviously an over-simplified assumption) that people tend to maximize their outcomes, then we would expect motivation to be highest for that level of performance which has the highest expected utility in comparison to other possible performance levels available to a person. In other words, expectancy theory would hypothesize that a student would compare his expected utilities of each of the potential performance levels, and that he would exert effort to reach that performance level which had the highest expected utility among all the potential performance levels.

Some General Comments on Expectancy Theory

The scope of this paper does not allow a review of the research on expectancy theory nor does it allow a critical evaluation of the numerous theoretical and measurement issues raised by the research

available to date. A number of reviews of expectancy theory and related research exist in the literature (e.g. Behling & Starke, 1973; Dachler & Mobley, 1973; Locke, in press; Miner & Dachler, 1973; Mitchell, 1972; Mitchell & Biglan, 1971). In general, however, both the predictive validities of the overall expectancy model as well as construct validation in terms of testing the component hypotheses of the model have provided moderate support for expectancy theory. It is obvious, however, that expectancy theory is still a largely over-simplified view of human motivation. First of all, expectancy theory might have little to say about a variety of behaviors which cannot be viewed within a decision framework, e.g. habits, impulsive behavior, etc. There is also good reason to believe that the maximization strategy assumed in expectancy theory should be replaced by satisfying strategies (March & Simon, 1958), since such strategies might better describe what people actually do in a decision situation. Furthermore the limitations of human cognitive processing abilities require specification of the decision space, the number of choice alternatives and consequences which people can and do take into consideration (March & Simon, 1958). Finally there are a wide variety of problems in the measurement of the expectancy variables, which have a bearing on how well we can establish the validity of expectancy theory. However, if we assume that expectancy theory in a very simplistic manner provides some guidelines about cognitive variables within the concept of motivation, it might be beneficial to look at the implications of this theory of motivation for the adult learning situation.

Implications of Expectancy Theory for Adult Learning

It is at this point in our discussion that we have to analyze some of the historical variables, the learning variables, in order to be able to infer what in the adult learning situation may contribute to adult students who exert a great deal of effort (are highly motivated) to achieve some learning outcome, and students who are less motivated to achieve some or any learning outcome. Instead of asking, as we normally do, why are students not more motivated to learn, expectancy theory allows us to turn the question around and ask, why should students be motivated to learn in any given situation (Lawler, 1973). The answer to this question lies in an analysis of the possible determinants of the expectancy theory components (expectancy, instrumentality, and desirability) which affect motivation for high learning outcomes.

Factors Related to Expectancy

Figure 4 provides a summary of the factors which have been found to or hypothesized to affect expectancy perceptions. One of the most important determinants of expectancy are the requirements of the performance level to be achieved. Thus a given performance level's difficulty, number of subtasks involved, amount and difficulty of reading requirements, necessary equipment reliability and difficulty of operating, the degree of structure of the task, etc. all have a bearing on the perceived probability with which that performance can in fact be achieved if the student tries. One of the most immediate implication of this effect is the necessity of clearly specifying the various performance levels and what they entail. Only in that way can a student accurately assess his

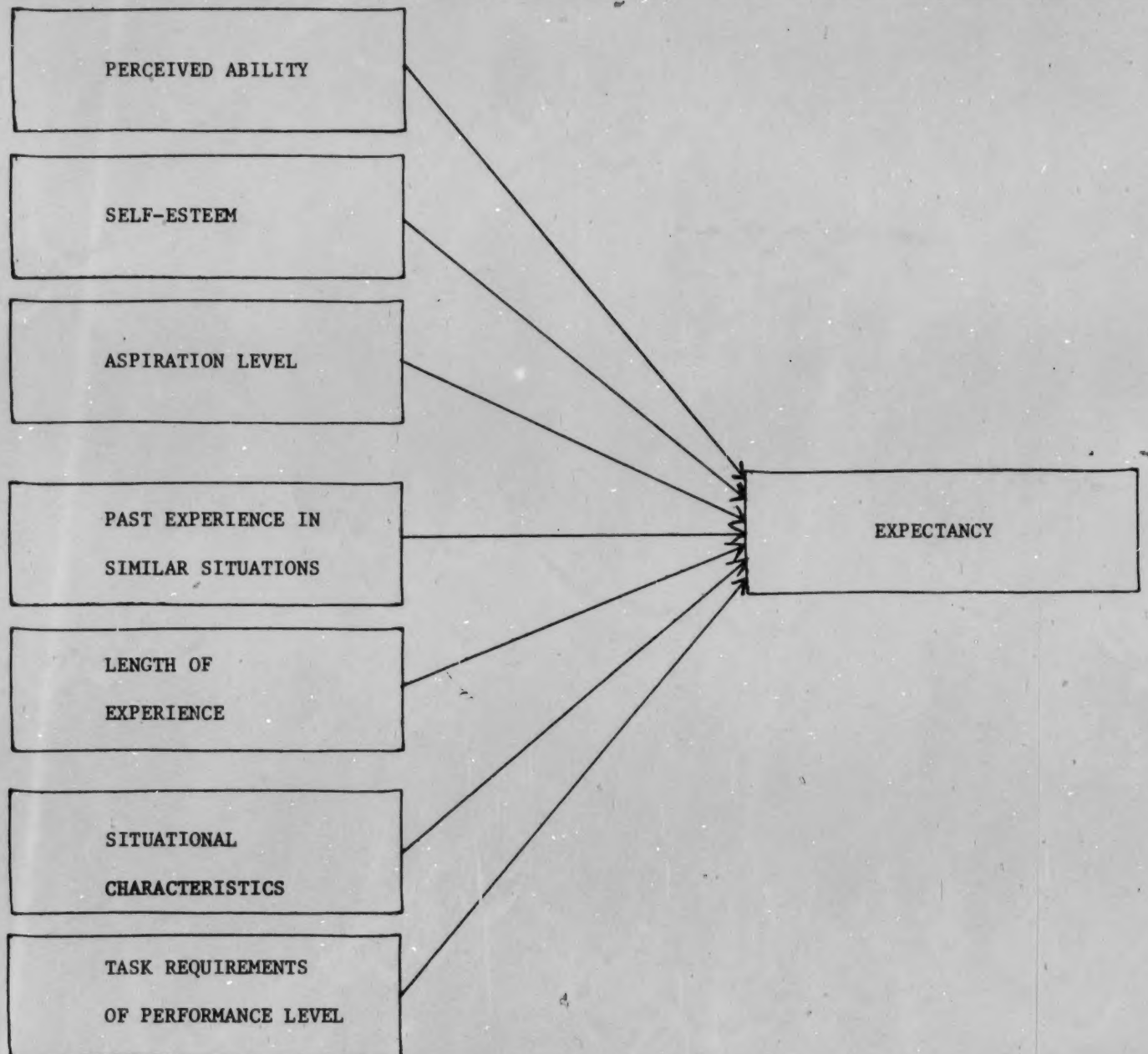

FIGURE 4 - FACTORS INFLUENCING EXPECTANCY

chances of achieving a given level of performance.

A related important determinant of expectancy are the characteristics of the overall learning situation in which the adult student finds himself. For example, even if a given student had the necessary ability and high motivation to achieve a given performance level, any number of situational constraints, such as lack of necessary materials, obscure reading materials, ineffective instructors (which of course includes a whole set of separate variables), etc., which are not under the control of a student, can prevent the achievement of that performance level. This is one case where we would expect to find a non-perfect correspondence between the performance level for which a student has the highest motivation and the performance level he actually achieves. The other case would be where the motivation for a given performance level is high but the student lacks the necessary abilities to perform at that level. In any case, if a number of situational characteristics not under the control of the student prevent him from reaching a given performance level, over time with repeated experiences of the constraints, one would expect the expectancy for that level of performance to be reduced and thus the motivation for that performance level, all other things being equal. Thus not only the kind of situational constraints, but the length and number of experiences in that situation have been found to have an affect on expectations.

Another set of determinants of expectancy are personal characteristics of the student. Perceived ability may affect the likelihood with which a student believes he can reach a given performance level. The

higher he perceives his own relevant ability to be, the higher would be his expectancy of reaching a given performance level, all other things being equal.

Another related personal characteristic is the self-esteem or self-attitude a student has of himself. On the basis of his learning what he can and cannot do, the self-confidence and general view of himself he has developed, the student should form expectancies with regard to a given performance level. Thus, the higher a student's self-esteem and self-confidence, the higher should be his expectancy for a given performance level, all other things being equal.

A final relevant personal characteristic is concerned with the amount a person seeks to achieve on the basis of some personality attribute such as aspiration level, achievement orientation (McClelland et. al., 1953) or adaptation level (Helson, 1964). It is possible that the more a person seeks to achieve on the basis of his personality, rather than on the basis of the utility of a given performance level, the higher would be his expectancy for a given performance level, all other things being equal.

Factors Related to Instrumentality

Figure 5 summarizes a number of variables which have been found to or have been hypothesized to affect people's instrumentality perceptions. As with expectancy, if we have some knowledge about how instrumentality perceptions are formed and on the basis of what variables these perceptions come about, we should be able to get some insights into some important determinants of motivation and the resulting behavioral consequences.

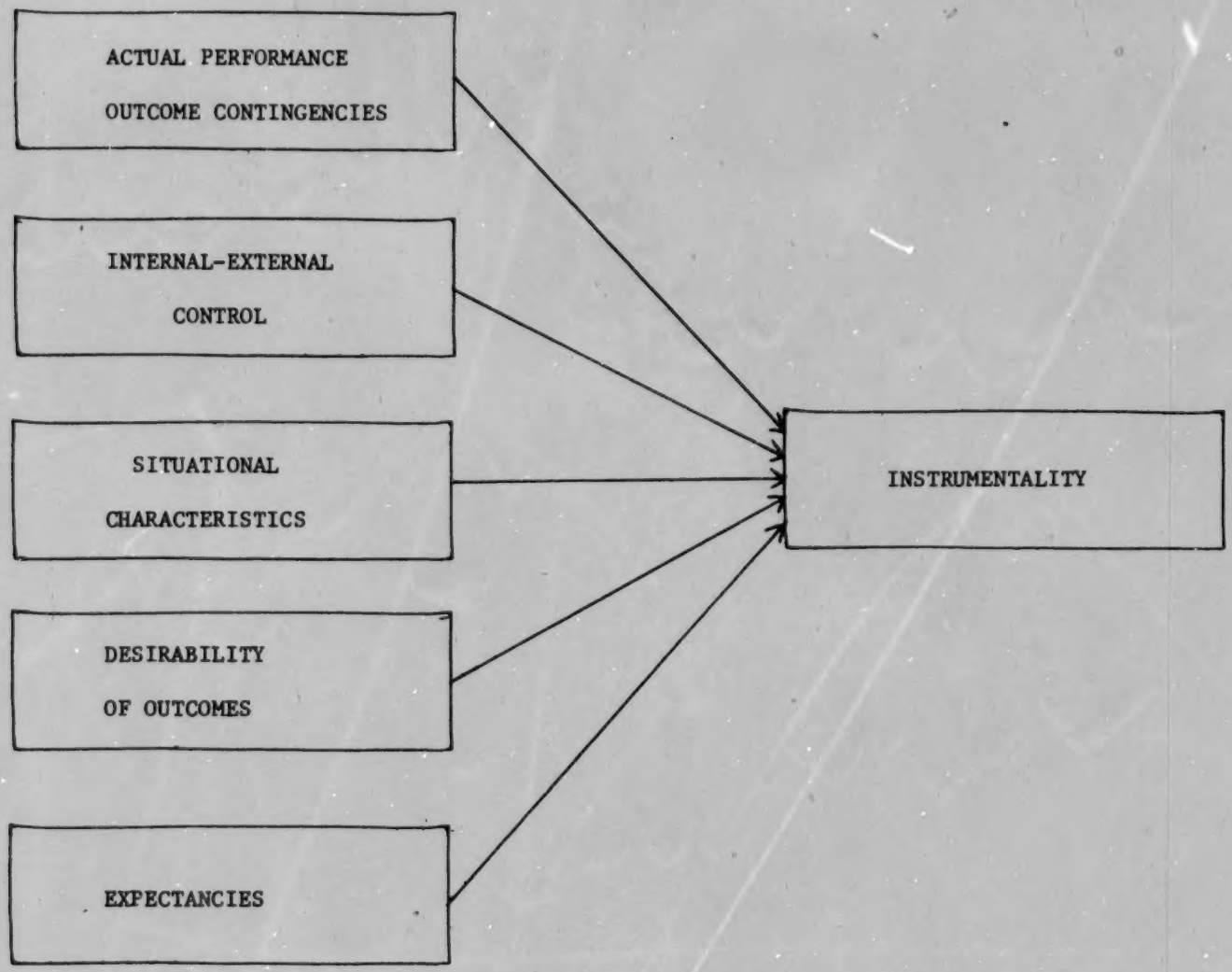

FIGURE 5 FACTORS INFLUENCING INSTRUMENTALITY

Since instrumentalities represent subjective beliefs about the likelihood of certain consequences or outcomes, given some performance level or other action outcome, the actually experienced performance-outcome contingencies in a given situation (i.e. the frequency with which certain events in that situation have actually occurred as a consequence of a certain performance level) are one of the most important determinants of instrumentality perceptions. Although research has shown that in gambling or betting situations people tend to underestimate the likelihood of highly probable events, and that the likelihood of highly improbable events are usually overestimated, in a very general sense subjective probability estimates are related to the frequency with which the events in question have occurred in the past. Therefore, the degree to which certain events or conditions are made contingent on a certain performance level or action outcome has a bearing on the perceived instrumentalities of that performance level for attaining these events. A direct implication of this state of affair for adult learning is the importance of insuring that desirable events or conditions (e.g. recognition, interest, feelings of achievement, promotability, salable skills, career insights, etc.) are indeed a perceivable consequence of certain learning or performance levels, and that undesirable events or conditions (e.g. being rejected by fellow students, lack of practical insights, lack of mastery, a non-representative course grade, boredom, exhaustion, etc.) are not a perceivable consequence of that learning or performance level. For example, if students desire the recognition value or the value for their career aspirations of a "A" course grade, and the course is organized and

administered in such a way that various learning levels or course performance levels have in the past had the consequence of a grade "A," then the perceived instrumentality of receiving a grade "A" would be equal for these various performance levels and thus this potential "motivator" would not contribute differentially to the effort students exert for high course performance over low course performance, all other things being equal.

Another important set of factors related to the instrumentalities which people perceive are the characteristics of the situation in which the motivated behavior occurs. There are probably a large number of separate variables within the situation which affect instrumentalities. These variables range from the characteristics of the actual task to be performed which could affect the degree to which different performance levels on that task provide (are instrumental in achieving) various intrinsic outcomes, such as feeling of achievement, growth, interest, challenge, etc., to the kind of teacher, supervisor, or fellow students which could affect the frequency with which a given student is reprimanded or praised for his performance, or the kind of information a given student receives concerning the likelihood of certain consequences given that he performs at a certain level (e.g. peer norms regarding acceptable levels of performance, a teacher who explicitly praises students for specific levels of performance, fellow students who communicate to an incoming student what he should expect if he really works hard or if he tried to take it easy, etc.). In general, the situational characteristics can affect instrumentalities by either explicitly establishing a performance-outcome contingency (e.g. explicit incentive

systems) or by creating conditions which either allow accurate perceptions of instrumentalities (e.g. clearly structured learning objectives, unambiguous assignments) or which prevent accurate instrumentality perceptions (e.g. frequent changes of instructors who have different "teaching philosophies," ambiguous course objectives). In this context it should also be noted that new students, who have had little experience in a given learning situation are likely to have inaccurate instrumentality perceptions. These instrumentalities are less likely to be predictive of actual performance levels, since they may direct effort toward unrealistic (in terms of what a student's ability or the situation will allow) levels of performance.

A further possible determinant of instrumentality perceptions is the nature of the relevant outcomes which a given person considers. Research has shown that in some instances people perceive less likelihood in attaining either very desirable or very undesirable outcomes, so that in the former case they don't trust the probability of good fortune whereas in the latter case they may be likely to defend against the probability of occurrence of some undesirable event. In either case, the nature of the relevant outcomes may affect the instrumentality perceptions. For the adult learning situation this would imply the importance of being aware of what the relevant performance outcomes are for students.

A related factor relevant to instrumentality perceptions is the expectancy of reaching a given performance level. On the basis of theory and research with regard to the achievement motive (McClelland et. al., 1953) there is reason to believe that expectancies of .5

probabilities bring into play feelings of challenge, so that a level of performance which a person sees a 50-50 chance of being able to achieve, may have a higher perceived instrumentality for the outcome challenge than a level of performance with either very high or low expectancy. Although research on this issue is still fragmentary, it does point out the possibility that the expectancy perception may interact with some of the instrumentality perceptions.

Finally, there is at least one personality variable which has been hypothesized to affect instrumentality perceptions. Rotter (1966) suggested that people, on the basis of their general experiences, differ in their beliefs about the degree to which they can exercise control over what happens to them. Called internal-external control of reinforcement (I-E), people high on internal control are more likely to seek information about things that affect them and believe that they can influence what they obtain, whereas people high on external control are more likely to feel that forces beyond their control determine what happens to them and thus they are less inclined to seek information about factors affecting them. Thus internal control people should not only have more information concerning performance-outcome contingencies, but they should also be more affected than external control people by rewards which are contingent on certain performance levels. This hypothesis would suggest that perceptions about instrumental relationships will not equally affect the motivation of all people. Thus in trying to establish learning level-outcome relationships in an adult learning situation, it is important to remember that the effect on motivation of these contingencies will not be equal across all students.

Analysis of students personality as well as what they value or desire in terms of learning or performance outcomes may be a useful undertaking in trying to help motivate students for higher levels of learning and performance.

Conclusion

This paper has attempted to briefly outline a cognitive theory of motivation. Although there are still many ambiguities and shortcomings inherent in this explanation of motivated behavior, expectancy theory provides a useful framework with which one can analyze some potentially important variables in a learning situation. We have provided a number of examples throughout this paper which have tried to illustrate how this motivation theory might be used to assess motivation problems within learning situations. Such analyses should provide a good basis for instituting evaluated changes, in order to create learning situations which provide better opportunities for motivation toward effective performance or learning levels.

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Bortner, Monge, Hultsch
Some Reactions to Learning Theories

ADULTS AS LEARNERS
May 8-10, 1974

Bortner

I'm going to abuse my privilege as an organizer of this conference to maintain my reputation of being difficult. I feel reasonably comfortable in doing so knowing that I'll be followed by Dave Hultsch and Ralph Monge, who can always be counted on to accentuate the positive. I'm always the nasty one in the crowd.

Measured against the needs in adult learning described by Maddox and the plea for comprehensive theory made by Monge, this threatens to turn out as a non-conference. Certainly, there's a certain amount of brotherly feeling, if you want to derive the word from , or a certain amount of conferring or shared burden-bearing if you want to derive the word from . It isn't that, that bothers me. Rather, our meetings thus far are like certain excellent non-books. Each chapter by itself is well thought out and informs the reader but somehow the major issues manage to fall between the end of one chapter and the beginning of the next chapter. It strikes me that the same sort of thing is happening here. Between the papers there emerges the feeling that we're really talking about and in a way contrasting two conceptions of the issues in adult learning.

One of the approaches to adult learning can be thought of as emphasizing questions about how adults learn. This approach is epitomized by classical learning theories. In pure form a learning theory is generic. The generic nature of these learning theories is brought into focus by the use and

interpretation of the results of animal experiments. All learning follows the same laws, and they emphasize all. Differences in learning between species or differences in learning during different segments of the life span are recognized. For example, the learning of older subjects is slower than younger; older subjects require different discriminative stimuli and different reinforces, and so on. However, while these differences are recognized they're regarded properly as in the domain of personality or developmental theory. No modification of learning theory is called for and no modification is made.

The other approach to adult learning I've heard here concentrates on the who and what issues of adult learning: the focuses on changes in cognition and perception, on describing traits and states of the learners, on mapping the effects of changed conditions on learning. Monge's presentation perhaps best characterizes this approach. Again, to highlight contrasts, in purest form there is little concern for learning theory as it is traditionally defined. For example, "the parrot associate paradigm" is often used but there is seldom an explicit acknowledgment that the very name of the technique refers to one of the classic learning theories. Investigators in the area of adult learning who operate from this stance do not explore experimental results in terms of what these results do or do not say about how an adult learns. Their interpretations focus on clarifications of the conditions and personal characteristics of those who do and don't learn. That is, the learning paradigm remains constant but the conditions and traits and states of the learner are examined. These traits and states includes those things which change over time and are associated with adult development. Thus, these kinds of study suggest that regardless of the learning paradigm used the descrepancy in learning efficiency between older and younger subjects can be reduced if the task is self-paced. In one sense, using the findings of self-pacing is a poor illustration of the

contrast which I'm suggesting. When pacing is contrasted with self-pacing, both older and younger subjects tend to do better under the self-paced condition. To my knowledge, no learning theory has any difficulty at all with that aspect of the findings. The sticking point comes when they try to grapple with why the change in learning conditions has a differential effect on the age groups such that the older subjects improve more under the self-paced condition. It is this point that the learning theorists, the purist, will suggest that the practitioner really ought to go and bother the developmentalist or rather nastily point out that the amount of difference accounted for by the age effect and by the age by conditioned interaction is really rather trivial in comparison with the effects of the conditions. I would propose that really understanding the nature of what is going on in such experiments might make a significant significant and not just a statistically significant difference in the strategies that we have designed for adult learning. To be blunt about it, I suspect that until and unless we examine the interface between these two approaches to defining and examining the issues in adult learning, we are going to continue to see and hear the kinds of things we've heard and saw yesterday.

First Combs and then Hoyer gave clear, well-organized, and obviously honest and committed expositions of their respective and contrasting points of view. During the discussion some very interesting things happened. Combs kind of allowed as how sometimes people had to learn things even when this learning did not meet perceived needs and that for relatively low level skills simplistic mechanical techniques might be more efficient. Hoyer was a little uncomfortable with using operant techniques to develop or to re-evaluate conceptual thought, and it seemed to me didn't quite hear all of the implications of Bill question about the use of operant conditioning when and individual is in transition or, if you will, shifting from a state where

one type of stimuli are reinforcing to a state where another quite different set of stimuli are positive reinforcers. In the meantime, I heard the questions that the audience was asking. In effect, "Hey, you guys, can you tell us when to try this model and when to try that one?" If you will grant that there is little pure learning theorists in most advocates, that question is very hard to hear. It's hard to hear because it challenges the generic assumption, the assumption that a good learning theory has to account for all learning. Many in the audience are reluctant to buy that. They know all too well the techniques efficient for teaching the young are not the optimal techniques for teaching the older.

In the meantime Bortner, who is a bit of a nut, is free associating like mad. He's thinking about Kelman's distinction between compliance, identification and internalization. At another point Brimm's diagram from socialization after childhood comes to mind. You remember that he said it takes relatively little power in effect to change behavior and knowledge at superficial levels. And working progressively through the table much more to achieve a transformation of values and of the self or to achieve real socialization. Carolyn comments started the wheels turning again. The authority on reference groups is talking about what she wants and what she decides, obviously not a yielder.

Last night that got me going thinking about a science fiction story about a guy being conditioned who decides not to respond, and that somehow reminded me of Clair Grays. Clair Grays has a terribly speculative theory and he kept sort of finding data, really not quite respectable. He argues the different learning theories are appropriate to different stages of adult development, that the learning approaches most suitable in early adolescence and during the mid-life crises are largely humanistic in orientation. At other times more operant approaches are likely to be more effective, has something to do with the nature

of the developmental tasks at hand. Obviously he's another nut who doesn't know what a good learning theory ought to look like.

Now, Perry is much smarter. He doesn't come out and actually say so in the book, Intellectual and Ethical Development During the College Years, but he kind of implies that as people move from absolutism to relativism that the teaching techniques should change. Perhaps one should use a different model for a person who is in absolutistic stages and a quite different model if he's a relativist.

I wonder, I just wonder if there might be some regularities between the depth at which learning is intended to occur and the kind of learning model that would be most useful. Could it be the choice of a learning model might be related to the developmental task at hand?

Go to sleep Bortner. You're a hound dog with no expert anywhere and especially in learning theory. I wonder if anybody else thinks like me. From those questions I bet something like that's going on. I'm going to find out this afternoon in those discussion groups. Some of those people are new to the field and just trying to get their bearings. I think that they suspect that no one model is going to work all the time. Those guys from industry that I overheard last night in the bar were talking like maybe that's where they're at. You know, I suspect one dimension of comprehensive theory that you're looking for is somewhere in this mess. It's going to require a marriage between the pure learning theory aspects of adult learning and the developmental aspects. Before you got to have a marriage, though, you have to meet and then you have to get engaged. So far as I can see they haven't even been introduced yet. But, somebody would have to be awfully rude or awfully dumb to say that - shut up Bortner!

Hultsch

Well, after that I feel that I have to accentuate the positive if only to try to modify Ray's behavior. However, I find myself in something of a situation that Bill Hoyer described with the teacher who was correcting the little boy - everytime I say something he keeps writing his digits backwards.

Ray has pointed out that one of the problems that he sees is that learning theories are generic and need to apply to all different kinds of situations and all different kinds of learners. One of the things, in order to try and accentuate the positive, that I want to do is really in a sense disagree with that notion. Clearly it's a notion that's been around for some time, but I think it's a notion which is in the process of being changed. Frank really responded directly to this issue by suggesting the notion that structure or qualitative changes are occurring in learning from childhood throughout adolescence to adulthood and perhaps to old age. Certainly I think this is the picture that would come out of my own research which has focused on organizational components in learning and memory in which the kinds of behavior that adults are engaging in appear to be qualitatively different from the kinds of behavior that adolescents or very young adults are engaging in.

Another perspective that's somewhat similar to this is perhaps provided by recent article in which he addressed himself to the issue of structural change occurring during early adulthood. He suggested a pattern of differentiation of formal operations may be occurring in early adulthood which would point to, again, qualitative or structural change occuring in this period of the life span.

Other investigators operating from a point of view have also been interested in looking at what you might call structural regression from things like formal operations back to concrete operations which are happening

in old age in elderly individuals. In spite of the fact that these particular studies have a number of methodical weaknesses that one needs to really worry about, again, the direction pointed to is one which suggests that indeed the learning processes are not necessarily the same at all points in the life cycle. So the notion that a learning theory is generic and applies to all species, individuals, and so on, I think is being modified. In a sense, in response to Ray's question, I think at least developmental theory and learning theory have been introduced. They may not be married yet - maybe they're just cohabiting.

Secondly, not only I think are there structural or quantitative changes which might be occurring in terms of ontogeny across the life span but indeed I think that we're beginning to realize and look at these kinds of factors involved in different generations. That is the notion that there isn't a single set of learning principles that apply to all generations but rather as you look at different cohorts, indeed different kinds of learning principles, learning activities might be going on across cohorts. In fact, in terms of the intellectual literature if you look at this, there is some evidence to suggest, indeed, that cohort differences or generation differences are more important than age difference is even. We need to begin to investigate the sources of these kinds of differences, and we haven't begun to do that very much at all. But clearly you can begin to speculate about some of them which would pop to mind immediately, for example, educational experiences. Clearly if you look at the kinds of educational activities that people have engaged in across the years, they're very different. In fact, one of my colleagues, Charles Taylor, is very much interested in this and has analyzed really the educational literature to see what kinds of different learning strategies, and so on, people who were educated at one point in historical time would have

acquired as compared to people educated at a different historical time. He is beginning to try and collect data to pinpoint some of those differences.

So I think the notion that learning theories are generic and you can find, in a sense, one set of learning principles that apply to all ages, to all species and so on, is probably on the way to being modified. Although, one might also argue that they're perhaps some principles which might apply across all of these different groups. I think we're really moving away from that view of learning.

Let me try also and accentuate some positive things by perhaps referring to some of the commonalities that I perceive amongst some of the papers as opposed to the notion that they were self-contained and separate kinds of things. I think one of the central factors that came through for me was the notion of interaction between the conditions of learning and the characteristics of the learner. I think spoke to this, Combs spoke to this, spoke to this. In other words, the notion that the characteristics of the learner interact with the characteristics of the learning situation and, indeed, the learner is an active participant. This, again, is a new direction that I think we're seeing in learning theory which departs from the notion that the individual is something of a passive recipient of learning material. So, I see this, instead of being a sort of side direction as Ray pointed out, that this is a different approach that perhaps developmentalists are interested in. I see this as a new direction in which learning theorists are interested and which is really going to be the cutting edge of learning theory in the next bunch of years. In other words, I think that we're reaching the point where the notion that the learning theorists manipulate simply the conditions of learning and see how one group of people operates under this condition as opposed to this condition, has been reasonably perhaps short-sided, if you will,

and is not being modified. I think it was Underwood who at one point in time complained about all the individual differences that he found in his experimental conditions, and he wished that would go away because it was a pain in the neck. Rather, people are beginning to recognize now that those individual differences of people under particular learning conditions are, in a sense, very, very central. And that, that indeed is one of the major kinds of things that we need to investigate. So I suspect that we're going to see as we go along in learning theories more and more attention being paid to age by learning condition, by subject aptitude kinds of interactions. We won't be looking at just condition effects any more. I think that this interaction between the conditions of learning and the conditions or characteristics of the learner that proves and proves - those two come to mind most strongly - spoke about is really going to be very, very central.

Another kind of commonality that I perceived amongst these things related to the notion of a relationship between some of the theories that people talked about and, what you might call, wider socialization factors. Particularly here some of the things that Hoyer and spoke about come to mind - the notions of expectancy and reinforcement, and so on. I think these tie together very well with adult learning, particularly because the older adult, I think, has certain kinds of expectancy which are very important for learning and which differ radically from those of the younger learner. Also, the older learner, I think, has very, very different kinds of reinforcement contingencies for learning which are radically different from those of the younger learner. I could perhaps go through a bunch of research to illustrate this but perhaps just mentioning some more general experience might be more effective. I have been extraordinarily impressed with this particular point as I've worked with older adults - let's just say adults - in my own research. One of the things that comes across very clearly are their negative expectancies in terms

of their capabilities and their abilities and how they feel they're going to be able to perform on the task. They will say things like, "This is going to be extremely difficult; you're going to find out how dumb I am." After they have finished, they say, "Boy, you know how dumb I am now; I really did terrible on that." I might add that I'm not talking solely about what you would call elderly individuals in this situation - these kinds of comments are elicited from young adults as well, people who simply haven't been in a formal learning situation for some time. I also get a feel for this kind of thing when I interact with older students in my class, students who have come back from working in some kind of work setting or something and are now returning to the university for one reason or another. The same kinds of messages come through. I might recall your attention to some of the things that Dr. put on the board when he was talking about expectancy and instrumentality and so on. Some of the kinds of factors which he suggested are related to these things; for example, perceived ability, self-esteem, past experience or the lack of it, and so on. If you think about the adult learner in these kinds of contexts, you begin to suspect, and again I think think the literature could support it, that the adult learner is really at quite a disadvantage with respect to many of these things. In fact, in a recent paper pulled some of this stuff together into a much broader perspective in an interesting paper in which they drew on social breakdown syndrome to illustrate not only the relationship between aging and learning but, in a sense, the relationship between aging and behavior in a whole variety of settings in which they pointed out that negative expectancies and labeling lead in effect to deteriorations of performance - which in turn lead to actual self-labeling or self-analysis as being incompetent and not expecting to do well, and so on - which further lead in a vicious cycle back to more negative labeling and

expectancies on the part of other people in the culture, and so on.

So, I think this general notion of the interaction of things like expectancy in terms of the kinds of reinforcement contingencies that we typically apply in learning situations is not really being appropriate for adults. I think some of the things that Dr. Combs spoke to relate to this particular point. These kinds of things illustrate, perhaps, some of the commonalities that have come through in these papers, at least for me. Now, clearly I don't think at this point we have what you would call a unified theory of learning. Indeed, it might be quite possible that at the present time for different particular groups or different particular points in the life span that one point of view or one model or one approach might be more useful than another one. However, I also have a feeling that in terms of the direction in which we are moving that we're moving in a direction which begins to take into account more and more of the complexities and interactions that are going on amongst various kinds of things. And, we're moving more and more away from the notion that learning is a set of rather simplistic principles which can be applied to all kinds of people in all kinds of situations. I think this is true of all of the models that have been discussed here that in a sense all of them are moving in this direction. And as we begin to move in this direction, I think we're going to find that there's more and more commonality between them - that we're developing more and more of a system of learning which, indeed, might be applicable to many of the problems that we're concerned with here in terms of adults as learners. I hope that I've accentated some of the positive things. Thank you.

Monge

Well, I think my ox has been gored; but I'm not sure where I'm bleeding! Dr. Bortner has made free with some of my research, I'll talk about some of his.

He spent some years working on Type A and Type B behavior patterns or personality patterns which are related to coronary heart disease proneness. If a Pattern A or Type A individual had a shield, a coat of arms, it would be a clenched fist holding a stopwatch. Pattern B, on the other hand, is a quiet, calm person not under time pressure, not overloaded and overcommitted, and so forth. Well, I asked why am I one of the speakers who got involved in this distinguished panel, and Dr. Bortner's already given you the reason for that. But, when he invited me to do this he said, "Don't worry about it. You dont' have to prepare for this. You listen; come in; make a few off-the-cuff remarks." Well, I saw him at lunchtime today.

"Where've you been Ray?"

"Well, I had some thoughts last night about this conference, and I went home this morning and typed them up."

So, he shows the two of us five or six pages of typed work. And I thought, "Okay, I'm a Pattern B - you know you can't shake me up like that."

Dave Hultsch didn't react strongly to seeing that typed work. I noticed, however, that as I came up in the lobby after lunch there he was with those five or six typewritten pages of Ray's, writing his own five or six pages. Well, I thought I was a Pattern B - didn't worry about those things - however!

Let me make a response or two to where I think my ox may have been gored. Ray quite correctly points out, quite seriously, that the work I've done with parrot associate learning really wasn't concerned with the parrot associate paradigm as such. I would have used anything, any convenient learning task. As it turns out, when I started on this work I had an equipment budget. I had to buy something to work with learning on adults. The only thing I knew about was a memory drum, so I bought one. I've been doing verbal learning, parrot associate learning, ever since. I could just as well done something else.

Dave found my memory drum unused one day, and decided he was going to use it to do free-recall research. Now he's been doing that for five or six years.

I'm not a learning theorist - I make no bones about that. I'm not any other kind of a theorist either. I did some work as a psychotherapist as a psychotherapist in group therapy with a clinical psychologist friend of mine several years ago. I used to say to him, "Bob, what kind of a theoretical stance do you take?"

And he says, "I really don't have one. What I need is a psychotherapist with a bag of tricks."

And I think the same thing applies to teachers. I'm a teacher myself, college level to be sure and sometimes I'm not so sure that's being a teacher that's being a figurehead of some sort - but anyway I view the issue the same way - you've got to have a bag of tricks. You don't need this learning theory or that learning theory or this personality theory or that personality theory. The clinician, my friend Bob, had to respond, to deal as a psychotherapist with one patient in a psychoanalytic way, with another patient in an way, with another patient in a way, with another patient in a behavioral modification way - he had a bag of tricks - he used them all. You ought to have a bag of tricks as teachers - you ought to use them all - you ought to not be embarrassed by the disarray in which those of us in the psychology of learning find ourselves.

I think, however, we ought to get down to the business of putting together a comprehensive learning theory. I don't agree with Dr. Hultsch. I do agree with Dr. Bortner on the generalities of generic nature of learning theory. I think a good learning theory, a comprehensive learning theory is one that talks about learning in all kinds of organisms of whatever age. I think the learning theory we have with suitable modifications brought in by developmental

psychology can be made to work in that way. They can be made to work individually; I think they can be put together. Even the oldest, the classical learning theorists, made some vowel at least to age as a variable. Tollman's work talked about some learning parameters but he also talked about the HATE parameters - H which was heredity, A was age, T was previous training, and E, I think, was endocrine status of some sort. Clark Collin, his theory is a big long equation that comes out as excitory potential of the function of habit strength times the sum of drive plus incentive motivation minus the sum of condition inhibition, reactive inhibition and oscillatory potential and stimulus dynamism, and so forth. Everyone of those parameters could be viewed in a developmental way. You could look at drive and incentive and say use the expectancy theory approach to say this is how drive states and the effects of incentives change with age, and with other kinds of individual difference variables like sex and conditions of life and so forth. The only concession, I think, that Hall made to individual differences did not come out related to age as such. I think that his formula for habit strength which is the increase in function of the number of reinforced trials multiplied by individual differences parameter, which he can specify.

So, there is room in all the learning theories, I believe, to build an age factor in if you want to do that. That may be the first step in getting a comprehensive theory of learning.

Let me just talk about some of the other presentations if I may for a moment. If I may use Dr. D notion of epistemic curiosity - I guess that's Bill M actually - there is in my mind an insufficient difference between Carl Rogers and B. F. Skinner to motivate need or wonder about that controversy any more. Of course, my predisposition is one to look for congruency - that's part of Pattern B behavior or modified Pattern B behavior. I'm glad

that Dr. Hoyer and Dr. Combs show the sense not to get into a fight even though I think that the two moderators who were insisting at all times that we didn't want to have a Rogers-Skinner debate, kept saying let's you and him fight. I think that their reluctance to engage in anything more than the scholarly debate that they did was a worthwhile approach. I don't think there's any point - let's look at it this way - there's time for an synthesis of the thesis and antithesis of those sorts of positions of the humanistic and of the behavioristic positions. I'm always reminded of the poem about the six blind men of Hindustan who were taken out to examine an elephant. One man leaned up against the trunk of the elephant, and said it was very like a tree; another one leaned against the side of the elephant said it was very much like a wall; another one grabbed a hold of the tail of the elephant and said the elephant was very much like a rope, and so on and so forth. None of them had a picture of the whole elephant, but each of them had a piece of the truth and they were very clear about what the piece of truth was that they had. Similarly, I think the psychological theorists all have a piece of the truth. They all see a piece of the elephant with clarity. Now we've got to put that elephant together. In the meantime, we can use those pieces as part of our bag of tricks.

I'm sorry that Dr. D did not follow up in going into the work of and other people who have looked at information processing from the aspect of age differences and realize that time is very short, indeed. But, Englass and Carrie, for example, have done work looking at the channel capacity as it changes with age - to what degree is the older individual unable to process information as quickly as the younger individual? Are there neurologically based deficits, perhaps, and something that might be called short-term memory that prevent the older person from holding a string, an input

string, long enough to process. The younger person can take a longer string of information, a string of bits of information, hold it in some kind of a temporary storage medium while it's being processed, one element at a time into some kind of a permanent or long-term storage. Older people seem not to be able to do that so well. Before they've processed the input they've lost part of it. That kind of thing, looking at that sort of thing can make information processing theory age sensitive, age relevant and not just age but other kinds of organismic and individual difference parameters.

I almost tore up my notes when I heard Dave talk about Professor D statements and how those might be youth and age perspective but I'm going to share with you anyway my ideas on the same topics because I went to the trouble of writing them down. With increasing age I think some of the following things happen. I think there are differences in the desirability of outcomes, that is to say the differences in the desirability of outcomes becomes less with increasing age. There's a very old study that I can't remember the author of that said that one of the first signs of age which came at around 30 was a feeling of emotional indolence, that I really can't get as hyped up any more about things the way I used to be able to. We could cast this, I think, in Helson's adaptation level theory, too, if we wanted to. That is to say that the more frequently you encounter extremes of stimulation, the more indifferent you become to them. I haven't stated that very well, but the indifference region between extremes tends to become larger with a repeated experience. Now, repeated experience is something you get as you grow older. So differences don't make a difference any more or to the same extent when you're old as when you're young. So looking at the calculations that one can do in the expectancy theory framework, some different ways of looking at the desirability outcomes as a function of age is worthwhile.

Dr. Hultsch has already talked about the perceived probability of individuals being able to perform at high levels, that there is a decrease in confidence and self-confidence with age, there is increase in cautiousness with age, cautiousness invention response or even venturing into areas in which you are not sure what your ability to perform may be. It's not likely that the older individual is going to go with the same frequency to the higher performance level, apt to strike out for those higher levels because he already has kind of closed himself off saying, "I can't do it anyway, why bother?"

On the issue of effort extended, there's less energy available as you become older. There is a convergence of the curves as Welford pointed out many years ago. There's a convergence of the curves that relate maximum capacity and required usual demand of the environment for functioning. That is to say that as you grow older, your reserve capacity declines. You tend to be less spendthrift of energy, both physical energy and psychic energy. Less energy is available, therefore, the high effort options are not going to be chosen to the same degree of frequency by older as by younger people.

In short, I think that there's going to be an optimization of the effort required versus the desirability outcome probably in all individuals. But, that optimization, that optimal point, that saddle point in the curve, is going to be at a lower level amongst older people than amongst younger people.

Computer-Assisted Instruction and the Adult Learner

Harold E. Mitzel

For the past 40 months Penn State has been engaged in the re-education of teachers in a unique way. Through the efforts of the faculty of the College of Education a curriculum in special education called CARE (Computer Assisted Renewal Education) has been developed. CARE 1 is a three-credit graduate level course for inservice teachers on the early recognition of handicapping conditions in children of school age. CARE 2/3 represents two interrelated courses dealing with diagnostic prescriptive teaching of the handicapped in the regular classroom. CARE 2 focused on pre-school aged children and CARE 3 emphasizes applications of principles to primary children, ages 6-10. CARE 4 is a one-credit course for the inservice teacher (or supervision) on diagnostic prescriptive teaching of the visually impaired child. Resources are being sought for the development of two additional courses in the CARE series.

To bring these courses to the people who need them a mobile delivery system was developed that would be functioned both in the rural areas and in sprawling traffic-choked cities. The courses are delivered to teachers and supervisors by means of a computer assisted instruction system mounted on an expandable van. The system is quite compact and contains 16 student stations. Typically, a van is pulled to a centrally located school and connected to electric power and telephone for a period of 8-12 weeks.

Experience shows that about 200-300 course completions can be achieved in this period of time with flexible individual scheduling of the adult learners.

We now have two mobile units, one located at Johnstown, Pennsylvania and the second at Springfield, Illinois. Beginning in the summer of 1974 we anticipate a nationwide-tour for the two vans from East to West and return. On returning from a three-year stint nationwide we anticipate incorporating the vans into Penn State's on-going program of continuing education in the Commonwealth.

Our students have ranged in age from the early twenties to the late sixties, and it might be of interest for you to know something about what we have learned from them.

First, our adult students often express initially a fear of the complicated machinery represented by the computer terminal. Interestingly enough within one or two hours they become absorbed in the interactive process of computer assisted instruction and apparently forget about their initial apprehensions. Second, our adult students characteristically express great satisfaction at being able to pace themselves through the course material. We know that older teachers tend to take longer than their younger counterparts. Third, older teachers are unsure of their ability to compete with others in typical classroom situations. The interaction with the computer seems more private and consequently less threatening to them.

A set of slides showing the delivery system will be displayed with an appropriate commentary and audience participation.

A MULTI-DIMENSIONAL MODEL FOR ADULT LEARNERS

S. S. Dubin

The Pennsylvania State University

Keeping up-to-date for professional adults signifies this basic imperative: a commitment to continuous new learning in one's specialty as well as related fields. New learning should, therefore, encompass an acquaintance with new contributions to knowledge by professional colleagues, familiarity with the tools, methods and approaches which are available in solving the problems in a profession and an effort to penetrate the front edges of knowledge in one's chosen specialty. The acceptance of personal responsibility for keeping oneself up-to-date is, by this definition, a Herculean task. The amount of new knowledge in each profession may differ in mass and depth according to the rate of change and growth in the particular field. But it can safely be said that there is no profession in which there is not enough new information to keep one constantly active in the new learning process.

The problem is how to maintain the motivation. The vigor for continuous new learning throughout one's whole professional life without serious diminution or coasting on previously acquired learning, is a serious problem today. Obsolescence may be a more common condition than we like to admit.

The model for updating I offer (Dubin 1972 a and b) here may serve as a practical base upon which new learning programs for adults may be developed. The model takes into consideration the

multi-dimensional aspects of the learning process (Dubin and Okun 1973) involving both psychological and environmental variables.

Psychological Factors which Influence Updating

The key psychological factor in updating is motivation. While a number of motivation models exist, the one I wish to emphasize is Expectancy Theory. Professor Dachler has earlier presented the Expectancy Model in detail and in its large dimensions. Now I wish to review some important dimensions of this model as a specific part of the updating process.

The Expectancy Theory of motivation is primarily concerned with explaining and predicting human voluntary behaviors using such concepts as preference of expected outcomes, and knowledge of relationships between behaviors and outcomes or between different outcomes. (Porter 1971)

The major emphasis is on the cognitive capabilities of individuals; that is the capabilities of individuals to "think" and anticipate relationships between events. The major assumptions are that the motivational force for an individual is a function of: (1) his expectancy that certain kinds of outcome will result from his behavior, and (2) the desirability of these outcomes. The theory proposes that work related behavior can be predicted once we know the valence or desirability that people attach to certain outcomes and their expectations of the occurrences of these outcomes.

The expectancy model uses three concepts: expectancy, instrumentality, and valence. Let me define each of these terms:

Expectancy - this refers to a person's subjective probability that a specific act will be followed by the attainment of certain levels of performance.

Instrumentality - this refers to the relationship between outcomes. How certain the person is that a given level of performance will lead to various rewarding or punishing consequences such as pay, recognition, boredom, pressure, advancement, group acceptance, etc.

Valence - this refers to outcome desirability. How desirable or undesirable are the consequences of work outcomes such as pay, sense of achievement, etc., in a work situation. Each outcome has a separate valence.

The expectancy model is diagrammed in Figure I. The first variable to be noted is Expectancy I. This variable refers to the belief that individuals have about whether the exertion of effort will lead to effective job performance or task accomplishment. In other words, this refers to the individual's degree of confidence that he can, in fact, do well in a job given that he exerts effort. A high Expectancy I would indicate that the individual believes that he can be effective in his job by exerting effort, while a low Expectancy I would indicate that an individual does not believe he can do well, or accomplish a task, by working hard. This expectancy is influenced by rather enduring perceptions that individuals have about themselves. Feelings of self-esteem influence this Expectancy I; people with low

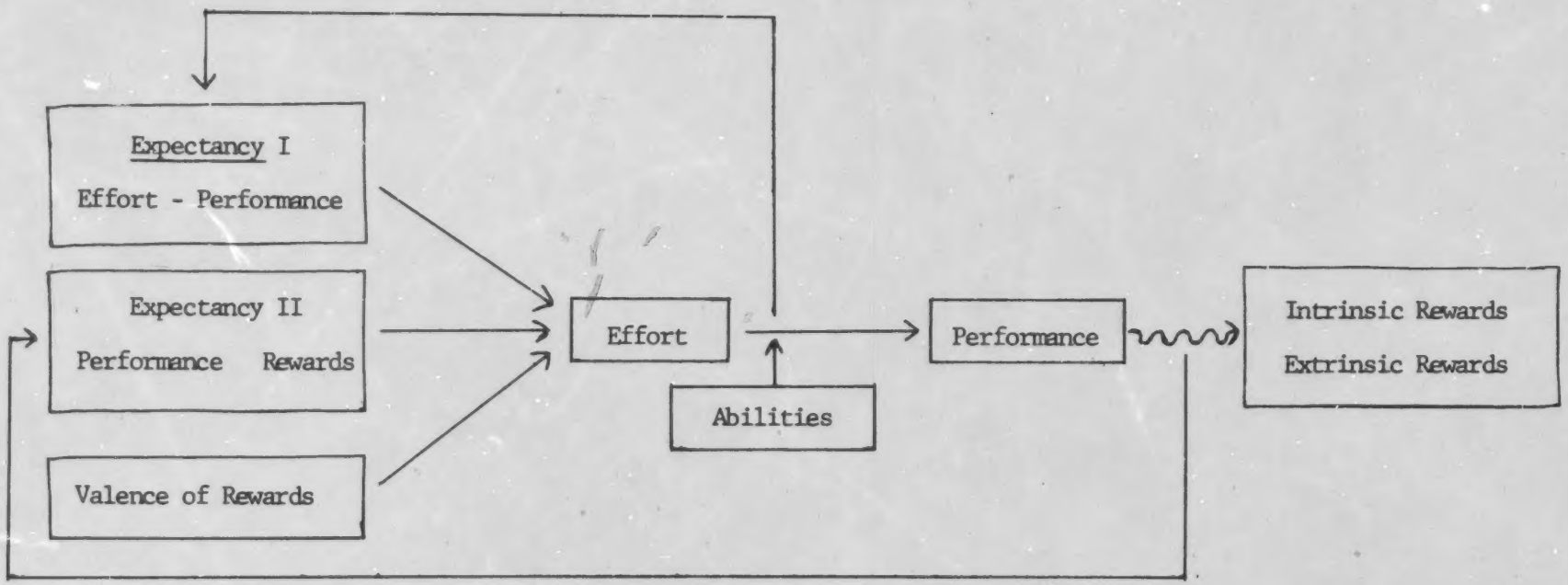

FIGURE I

A theoretical model of employee motivation adapted from Porter, L. W., and Lawler, E. E., Managerial Attitudes and Performance.

self-esteem may tend to have lower beliefs that their effort will lead to effective performance than individuals with high self-esteem.

Second, Expectancy I beliefs are influenced by aspects of the performance tasks themselves. Specifically, the degree of performance difficulty will influence this expectancy. If performance tasks are seen as very hard to accomplish, individuals will have low Expectancy I's. On the other hand, persons with higher Expectancy I beliefs will see performance tasks as relatively easy to accomplish. Thus Expectancy I beliefs are a function of both individual and job situational characteristics.

Expectancy II or instrumentality refers to the person's belief that task accomplishment will lead to reward or desired outcome. Thus, this type of expectancy involves beliefs about reward contingencies. These rewards can be administered by several agents - the individual himself, his supervisor, co-workers, the organization - and thus it may be possible for an individual to have entirely different beliefs about whether effective performance will lead to a feeling of accomplishment or whether it will lead to an increase in pay. To state it in another way, Type II Expectancy relates to the individual's confidence that he will experience some kind of self-satisfaction from the task and that the organization, his supervisor, or peers, or family will provide rewards for this accomplishment or its completion. These perceptions are influenced by past experience, observation of what happened to other employees, or simply talking with other persons in the organization.

The third element of the model concerns the valence of rewards. This variable refers to the relative degree of preference or disabilities for different kinds of outcomes which result from effective performance. These rewards can be broken down into two major types: intrinsic - those supplied by the individual himself - and extrinsic - those supplied by the organization or other agents. Feeling of accomplishment, feeling of challenge, and self-fulfillment rewards are of the intrinsic type while pay increases and working conditions are more extrinsic. Note, however, that no assumption is made concerning what kinds of rewards are more valent for individuals. Some people may have higher valences for the extrinsic variables or for both extrinsic and intrinsic. The expectancy model as a whole, emphasizes differences among individuals and no <u>apriori</u> assumptions are made concerning which rewards are more desirable than others. Porter (1971) proposes that these three variables combine in a multiplicative manner to determine a person's effort. If any one of these three variables is low, then the individual's motivation to exert effort is also assumed to be low. On the other hand, high motivation to exert effort will be high when individuals believe that their effort will result in effective performance, when they believe that effective performance will result in the attainment of rewards and when they value these rewards.

Porter goes on to indicate that even if an individual has a high motivation to exert effort, his actual performance levels may not necessarily be high. The ability levels of individuals must be considered as shown in Figure I. People with low ability may never be able to "convert" their efforts into effective performance.

Whether or not actual performance leads to rewards depends on several factors. Routine tasks may not offer much feeling of accomplishment, challenges, etc., whereas more difficult tasks may have much greater potential in providing intrinsic rewards.

The actual degree of connection between the extrinsic rewards and effective performance will certainly depend on organization and supervisory practices. Often effective performance does go unrewarded thus the wavy line in Figure I. The degree to which rewards actually are contingent on task performance will influence the individual's future Expectancy II feelings, and therefore a feedback loop is provided in this figure. Similarly, whether an individual actually performs effectively when he exerts effort will influence his Expectancy I beliefs, and this feedback look is also provided.

An organization can improve the performance of its employees by rewarding them for updating their skills and knowledge. On the other hand, an organization can inhibit its employees when it does not reward the employees who attempt to innovate or update their work.

Work Environment

The second major set of variables, after the motivation one, can be grouped under the heading of work environment. Since a large percent of professionals work within organizations, the environment in which they work is strongly influenced by many differing and complex systems such as organizational climate, supervisory relationships, the job itself, colleague interaction, and management philosophy.

First, organizational climate can be described as those policies and work practices that affect motivation, influence attitudes, and modify the behavior of its members. All these components, as implemented by management, create the environment of the organization. The environment can be one which stimulates the members of the organization to grow and develop or causes them to be inhibited or stifled, and to operate at less than their full potential.

A vital organizational climate is characterized by high productivity, excitement, sense of purpose, feeling of accomplishment, sense of personal opportunity, recognition and rewards, openness to change and new ideas, and strong contact with ideas and people outside the organization. You can't force people to become motivated, but you can create a climate in which most people will motivate themselves to help an organization reach its objectives. If the individual lacks a clear and strong perception of the organizational climate, it leaves him uncertain, and he takes fewer risks and demonstrates less of his potential.

Wallace Wilson, a group vice-president at General Motors, recently wrote that engineers who ignore the meaning of technical obsolescence become its victims. He states, "We can't afford to become technically obsolete because then we approach problems with outdated viewpoints, theories and techniques." (1969) He believes that the individual must be basically responsible for his own development and updating. However, and this is a very new twist in my opinion, he states that the employer has an equal opportunity to provide the environment and incentives to encourage the engineer to

broaden his base of knowledge. The employer must show that there is a premium put on up-to-date education.

Another way in which the organization's climate is expressed is through the manager's work practices. For example, engineering managers are generally judged by higher management primarily against a criterion of results such as meeting schedules, product cost objectives, budgets, and quotes. For this reason, the manager sees himself measured usually in short term perspectives. His response to this value system encourages exploitation of the employees' skills and capabilities with little thought for the long run. In this value system we see:

- the specialist used over and over again, with consequent narrowing and limiting of professional development;
- pressures of the job which 'burn out' the employee in his highly productive years with little time allowed for refurbishing until he becomes obsolete;
- work priorities which interfere with the employees' educational commitments;
- work load and time pressures which prevent researching and keeping abreast on company time. In some companies, there is no time allowed in the budget for reading. Every hour has to be recorded as productive work. Engineers have mentioned to me that they feel guilty going to the company library to read a technical journal.

To counter this type of system, IBM has recently added to its performance appraisal form a section which stresses people-management.

It tells the manager that he can meet his schedules, budgets, etc., and still fail his job if he is seen as a poor manager of people. A successful manager can produce a worn-out, used-up, obsolete, and topped-out team.

In summary, the organizational climate can be one that stimulates its members to grow and develop. Or it can be one which causes the employee to lose interest in his work and seek satisfaction elsewhere. The key to maintaining and enhancing technical vitality is to provide a work environment that turns people on. Organizations must identify work practices that show both the manager and employee that decline in competency is not tolerated and that reward comes to the manager who causes his employees to grow and increase their capabilities.

Supervisory Behavior

The supervisor occupies a crucial position as catalyst in the updating of his group and thereby maintaining a company's vitality. Our studies on engineers and managers indicate that supervisors are not, in fact, developing their subordinates' professional growth. In a recent study (Dubin and Marlow 1965) we found that 64 per cent of 2,000 engineers thought that their supervisors took a noncommittal attitude towards their education and development. Similarly, in other studies, 51 per cent of 3,600 industrial managers (Dubin, Alderman and Marlow 1967), and 42 per cent of natural resource managers (George and Dubin 1972) reported that their supervisors were noncommittal about their subordinates' further training. These findings suggest that supervisors are not developing their subordinates' potential to

the maximum. These findings were corroborated in a 1969 National Science Foundation Study of R & D scientists and engineers (Renck, Kahn and Gardner 1969) which reported similar attitudes of non-interest on the part of the supervisors concerning the professional development of their subordinates.

Landis (1969) of New York University after completing a study on engineers concluded that it is "the immediate supervisor that counts in the development of subordinates. If a boss does not encourage a man, he will not take further course work . . . unless the supervisor is willing to encourage and accommodate his men in spite of the possible interference with his work schedule, few men will undertake continuing studies."

The Job as it Contributes to Growth vs. Obsolescence

It must be recognized of course that many jobs include assignments that are limited in scope, have great pressures to get the work out, carry a heavy work load, are routine, are highly specialized and provide little opportunity for broadening. They present no challenge at all. Management should redesign these jobs.

A job should contribute to growth. Managers should know the fundamentals of motivation and learning so that assignments will fertilize the employee's self-development. The ideal task should require the use of experience and formal knowledge in a new way, thus providing a sense of accomplishment and forcing the addition of new experiences. Recent evidence on job redesign (1973) indicates that jobs for managers as well as non-managers can be redesigned to improve

performance by incorporating such aspects as: new learning, new behaviors, rewards and motivation, improved communication, and feedback. Productivity increases ranging from 5 to 40 per cent have been reported. If changes in job design are going to influence a manager's motivation, they must increase the value of certain rewards that are seen to depend on effort. The basic argument is that to the extent that job changes have a positive effect on motivation, it is because they change a person's belief about what the consequences are for putting forth high levels of effort. Companies such as Corning Glass, Motorola, Xerox, Banker's Trust, Texas Instruments, Weyerhauser Lumber Company, Oldsmobile, and Arapahoe Chemical in the United States and Imperial Chemical in England, Norsk Hydras in Norway, SAAB and Volvo in Sweden have redesigned jobs at both the managerial and non-managerial levels. The results in all cases have been beneficial both to the company and to the employees. In Norway, a major experiment on job redesign was carried out in a metal-working industry. A dilapidated wire-drawing plant was chosen for the experiment on the grounds that if improvements could be realized there, they could be achieved elsewhere. But, productivity increased so much due to job redesign that the experiment was suspended: the unskilled workers in the experiment had begun to take home pay in excess of the most skilled workers. This is a good example of how motivation can be stimulated by job redesign.

Marguiles and Raia (1967) asked 290 R & D scientists and engineers, "What was the most fruitful learning experience you have had over the past year or two?" The most frequent response was on-the-job problem solving (42 per cent). This was described as being assigned to

"interesting tasks," "broadening projects," and "writing proposals which force me to dip into the literature and become current on everything connected with the project." When on-the-job activities include challenging assignments, the new tasks force the scientist, the engineer, or the manager to assess his own knowledge and fill in his own gaps and deficiencies. Responsibility, job involvement, and challenging work assignments all contribute to the first steps to continuing education, awareness and individual motivation. In summary, a job must possess three characteristics if they are to arouse motivation:

(1) the individual must receive meaningful feedback about his performance.

(2) the job must allow the individual to use his abilities to perform the job effectively. He should perceive that his skills are being tested for accomplishment.

(3) he should have a high degree of self-control over setting goals and defining paths to goals.

Colleague Interactions - Their Importance in the Updating Process

One of the important components of the work environment is the stimulation provided by peers. Colleague interactions are a major source of updating and new learning. Informal talks trigger innovative ideas. Colleagues point out sources of data, how to approach an industrial problem, which approaches have been tried and with what results, an opinion on best approaches and information on current status of research. Stimulating experiences can come from interchange with others, working with managers and experts, talking to people or

participating on panels and committees. The importance of an organizational structure that encourages communication among colleagues, superiors and subordinates, cannot be over-emphasized. In a study of 20 successful weapons systems (Rosenbloom and Wolek 1970) 70 per cent of the information and ideas important in the development of the weapon originated is personal contact.

Management Policy

Finally, an organization should have an explicit policy that promotes updating for its employees. Many companies have educational assistance funds which reimburse employe s for continuing education. In our study of engineers (Dubin and Marlow 1965) 79 per cent reported that their companies had educational assistance programs, showing the widespread availability of company payment for educational courses, but three-fourths of the engineers reported that this availability had no effect in motivating them to undertake further education. Evidence derived from these studies also indicated that taking additional course work was not sufficiently rewarded in industry and was not a requirement for promotion or salary increases. Of more importance, the availability of financial assistance for self-improvement is obviously not a sufficient incentive for updating its employees. In a recent study (George and Dubin 1972) we proposed that 20 per cent of a professional's time should be spent on keeping up-to-date.

In many organizations, long range planning is notably absent especially in preparing employees with proper skills to carry out

the strategies for the next three to five years. Management should ask:

- what changes in technology, competence, and capabilities will be required over the next five years?
- what are the technical capabilities of the personnel today with regard to technology and the product?
- does the work schedule allow for continuing education, broadening experience, etc., necessary to have a more competent team in the future?

If organizations are concerned with technical vitality and plans for the future, it is not enough to plan strategies for its growth, unless it plans parallel strategies for the development of its highly qualified professionals.

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ECLECTIC MODEL OF ADULT EDUCATION

OR (ECLECTICISM DELETED)?

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> "Year after year groups of educators sit in convention and . . . nod in solemn agreement when someone says that there is a crucial need for a philosophy of . . . adult education. Fortunately, . . . in our tradition, we can't have it. As long as we are a pluralistic society, as long as our public is made up of many publics, we shall continue to have philosophies of education in conflict with one another. Meanwhile, educators will continue to muddle along as best they can . . . on the basis of different philosophies (or different assumptions), often not formulated at all; and they will continue to feel pressure from different individuals and publics with varied philosophies and assumptions. It has been said that the United States does not have an ideology; it is one. The same may be said of American education. Like the American ideology, the philosophy of education is tentative, changing, and eclectic." (Diekhoff, 1963)

These words of over a decade ago seem to be no less true in adult education today. American education is in many ways its own ideology. Consequently, adult education is an extension of that ideology in terms of learning models and technologies of instruction which have been adapted from the education of children and youth. Thus, it is not surprising to hear adult learning theorists expound in terms of operant learning, cognitive development, information processing, and social reinforcement. Similarly, the technologies of adult instruction are adapted from the multi-media sophistication of the world of the child-learner.

For those of us in academia, the constant interchange of ideas, theories, and beliefs is a way of life; and the application of one set of theories to different populations and age groups is most typical. The identification of individuals and academic units with a certain body of theories, or with a particular discipline, is at the core of academic freedom and life style. In a multi-disciplinary college such as Human Development, and in a conference which brings together the interests of three different colleges, this diversity becomes even more apparent. Such diversity, however, does not usually lead to harmony, or agreement over one all-encompassing explanation. At the turn of the century the Harvard philosopher, Royce, said it quite well when he noted that he had no trouble understanding Hegel's concept of the Absolute - that was simple; but what he had difficulty with was following the discussions at faculty meetings (Flexner, 1960).

In many ways, the invitation to address this topic acknowledges that diversity, while perhaps bearing the secret hope that an eclectic model will satisfy all - a sort of "happy commune" for learning theories and technologies of instruction. It must be stated at the outset, however, that no such universal explanation exists - least of all under the label eclecticism. This term is usually identified with the extreme of a continuum, which posits formalism at its opposite end. While it is theoretically possible to reside at the end of a continuum, very few people do. The formalist, much like Spence's (1973) digital thinker, tends to impose the maximum of rational order and over-all consistency, yet his empirical training (which cannot ignore reality-based facts), moves him quickly towards the center of the continuum. Similarly, the

eclectic, in his analogic approximations of reality, cannot ignore a recurring theme or abstraction which helps to systematize his explanations.

Thus, it is the view of this writer at least, that while adult instruction is eclectic in a way which parallels education in general at the same time, there is no eclectic model here which will selectively order and combine diversity and (otherwise) incompatible theories into a harmonious unit.

Another way to view this same issue is to consider the adult educator as technologist and practitioner, as contrasted with theorist or scientist. The latter can continue to promote and adhere to a given theory, while the practitioner, if he is to be truly effective, must have a textbook or cookbook of theories, from which he can extract a technique to fit a specific situation. The following vignette typifies this: Professor Academic has centralized his research and instructional activities around a predominating view or theory, one which was, perhaps, part of the zeitgeist of his graduate education. He translates this theory into an adult education context, perhaps marketing it through the continuing education or extension systems of his university. The program is a success, and Professor Academic is duly praised for having shed his coat of ivy and becoming "relevant." The problem sets in, however, when one of two things occurs: somewhat like the Peter Principle, the successful program is marketed one step too far and finds itself in the wrong context for its theoretical base; or Professor A. devises a new program (now that he is a successful adult educator), which does not match his theory, and he finds himself out of his

element, so to speak. Thus, sophistication and maturity will only come to the field of adult education when the practitioner can reach into his bag for a variety of remedies and find one suitable for a given context, rather than prescribing a leech or aspirin for everything. This is an eclectic approach to instruction, but not an eclectic theory.

Now that I have disposed of the topic given to me, I must invent a new one - or at least redefine it. I am sure that the conference leaders would not let me conclude my paper at this point. Their response to what idea would not be unlike a personal experience of a few years ago. A native westerner, I proudly escorted an easterner to a first look at the Grand Canyon. A few minutes after reaching this majestic sight, I was asked: "Is that all there is?"

Gerontological Continuing Education: A Starting Point

The present paper describes a long-range programmatic development in adult instruction - one with a specific focus and target population. The emphasis here is on theoretical and methodological implications rather than the program description. It is based on the efforts of four years to develop meaningful educational materials for the providers of social and health-related services to adults.

This work began with postulating some very basic distinctions, assumptions, or observations.

1. The first distinction is the fundamental one between science and art. The development of a theoretical framework for adult instruction, and the transition from theory to a methodology for isolating and studying key variables in the learning process, is a task appropriate

to science. Science is objective and open to replication. The delivery of adult instruction or the educational process, on the other hand, is an art. Art tends to be unique. Two key observations follow from this distinction when attempting to mix science with art, or vice-versa:

Despite its innate value, a good work of art seems "better" when it can be appreciated and shared by the widest possible audience. Thus, in packaging and producing a good work of art for a wider marketplace, its uniqueness must also be transported to maintain its artistic value. Frequently in adult instruction, this uniqueness is embodied in the charisma of the artist or instructor. Our observation here is, quite simply, that many past failures in marketing adult education have resulted from not accounting for this charismatic factor when packaging programs.

The second observation was that there seems to be a widespread failure to utilize a viable scientific framework in the design of adult instructional programs, which seems to account, in large part, for the absence of a methodological base for program evaluation. Thus, many adult education programs are looked upon as <u>training</u> and <u>service</u>, is opposed to something bearing upon the generation of knowledge. Taken together these observations imply the great difficulty inherent in blending science with art - a necessary step towards the development of effective, academically-based adult education.

2. The preceding distinction led to a more personalized observation and assumption regarding the academic base - in this case, a College of Human Development. In its research and training orientations, a professional college must have strong basic and applied

components. This is not necessarily beggin the question of science vs. art. It merely states that the academic commitment to adult instruction espoused in this College must be based in both the real world and in a strong theoretical framework. While living with the ambiguities and complexities of attempting to be an "academician-would-be-artist," one cannot help at the same time recognizing the inherent value in basing adult education activities in an academic unit.

3. The next assumption states that for any measure of relevance and success, applied research must have a community focus for its interventions and applications. Similarly, training for service is incomplete without training in the service context. McKeachie's (1963) classic work entitled, Psychological characteristics of adults and instructional techniques in adult education is inappropriate here since his data was the ubiquitous college sophomore. That complex bridge between an academic and a community base is therefore assumed to be an important part of this structure (cf. Hickey & Spinetta, 1974).

4. The next assumption was not intended to reflect criticism of other programs, although some negative inferences are readily apparent. From the academically-based perspective, the conclusion was that training and adult instruction in the form of continuing education runs counter to the role and functions of a university when provided solely as a service. While the dissemination of knowledge is a viable function of a university, nevertheless, institutions of higher education at this point in time are almost required to get multiple use from the same dollars. The integration of basic functions of a university is vital to its future. Therefore, an academically-based adult education program

simply cannot afford to provide only a service. It must generate new knowledge - be it program development or evaluation, service effectiveness, or knowledge about how certain types of individuals learn specific kinds of things.

5. This led to a corollary: In evaluative research, the quality of service programs can be explained, in part, by the effectiveness of training service providers; and, evaluation of training effectiveness is an appropriate function and task of a university.

It becomes very important then to relate ntinuing education to the research and training dimensions of academic programs. Continuing education is viewed in this perspective not as a typical university service; but rather, as applied training for improving both the quality of service programs and the relevance of residential training programs (in a professional college) for future service providers. The evaluation of continuing education programs is also not a service. It is a legitimate form of research for the professional college in measuring its effectiveness as trainer, and its cogency as applied researcher in the real world. Moreover, its legitimacy is heightened by the apparent lack of existing precedents for continuing education evaluation technology on the one hand, and the increasing need for quantification, accountability, and cost-benefiting on the other.

6. The final postulate in this process resulted from a very typical review of existing materials and literature. This review was focused on the forementioned basic goal of developing relevant instructional programs for the providers of services to older adults. It was concluded from this review that there was virtually nothing available,

considering the criteria which quite naturally evolved from the previous observations and assumptions. Of course there were some educational materials and programs available: those with nontransferable charismata; skill-training programs of limited focus; nationally reputed training programs which were in fact merely syllabi and bibliographies; and numerous "service" programs which were not really applicable and/or lacked theoretical frameworks and bases for evaluation.

With these six major issues as guidelines, adult education program development commenced by defining the target population, program substance, theoretical framework, and a methodology for program assessment.

Program Definitions

This program was called manpower development in gerontology, or gerontological continuing education, and was defined as professional training on a short-term basis for the providers of health care and social services to older adults (cf. Hickey, 1973; 1974a). It would seem to be somewhat outside the scope of this paper to detail the rationale for selecting this particular target population. Let me summarize only briefly two major reasons for beginning here. At the start of this decade, the greatest manpower needs in gerontology existed at the experienced practitioner level - that is, individuals currently working in the human services field, and with an educational background ranging from high school graduate to masters degree level. On the lower end of this spectrum they are individuals providing direct care and service as aides and assistants - and the research literature shows us

that these people have the greatest impact (positive or negative) on the client population served. The higher end of this range, for the most part, represents human services professionals who have made career shifts (e.g., the social worker who has moved from a county's adoption service to its aging program).

The second part of our rationale reflected the nature and history of this educational context, namely, a land-grant university with multi-campus and county extension systems which have been serving a statewide constituency in some specialized ways since the last century. This history seemed to mandate a "train-the-trainer" role for Penn State, as opposed to direct adult education. Thus, in providing a training module in pre-retirement planning for human services workers we are in effect teaching them to work directly in the instruction of a client population of adults. The Faculty Seminar Series in Gerontology, which is being conducted here presently for community and junior college faculty is an example of how Penn State can ultimately reach the adult education market on a community level through an informal consortium. Therefore, while no one denies great need for academically-based adult education for all age levels - one with a strong research component in adult learning - nevertheless, societal priorities, the university context, and the professional college base seemed to warrant this focus on service providers.

Program Content and Context

The program substance or content was determined in two ways, first of all, the research and training literature in this field

nationally was examined closely for all possible topics, areas, and issues which were seen as important to gerontological practitioners in the health care and social services context. These issues were listed in terms of information and skills for a survey of the target population in Pennsylvania. Their rating of these topics, plus additional information they provided, led to the establishment of program development priorities which have included the following: basic gerontology, environmental therapy, sensory impairment, communication skills, self-maintenance skills, management of grief and role-loss, advocacy, consumerism, pre-retirement planning, and outreach program development (which includes nutrition, life-safety, transportation, and environmental hygiene).

The training programs are developed and conducted in the service context itself for all staff levels within that context. The topic of self-maintenance skills, for example, is generalized to the functional roles of nurse supervisors as well as aide trainees and volunteers. A degree of specificity is provided by the overall purpose and function of that given agency or service context. Self-maintenance skills remain generic, while their application to a state hospital staff would differ from a home health agency in a rural community.

The emphasis in this project on contextual training of all service providers is based on the relationship between content and context. The continuing education process represents the interaction of an individual with his changing environment through the medium of some sort of content or experience. By contrast, it does not represent an individual, in quasi-isolation, absorbing or assimilating a catalog

of new facts. Thus, the provider of services here is interacting with the client population, with his fellow providers, and with the context in which the service is delivered. Once again, in contrast, it is not atypical to conduct a continuing education program on a college campus, to which one or two key individuals from various agencies are invited to interact with the content of the program as well as with their counterparts from other settings. While there may be some benefits in this, a typical negative outcome occurs when individual trainees are unable to transfer the content of the educational program to their own work context. It is not surprising that the evaluation of such training programs is relatively unsophisticated. This is not a minor point. There is a very real distinction between today's conference (in this room) and contextual training - a distinction which becomes blurred when we label them both as continuing or adult education.

To operationalize this interaction of content and context, the traditional definition of learning as a form of behavioral change, must be more specific. In this project, we have defined the learning process delivered through the mechanism of continuing education as a modification through experience of various work-related behaviors in a social context. Evaluation then, is seen as a systematic process for determining the value, effectiveness, or adequacy of the training experience according to definite criteria and objectives. Thus, the training experience implies a specific content, its application or demonstration in the context or site where the training occurs, and the interaction of the trainees as a team functioning together in the provision of a set of specific services. The evaluation of this type of training then

involves the assessment of the content, and the social and work interactions in terms of service effectiveness criteria. Another way to state this is determining the degree of congruence between the collective performance of staff and the overall objectives of the services.

Conceptual Base: The Client Population

The theoretical framework for gerontological continuing education has been an evolving one in many ways - perhaps supplying part of the reason for the invitation to address the issue of an eclectic model. The starting point here, however, has been rooted in a humanistic value judgment about the client population of older Americans requiring health care and/or social services. It was determined at the outset that individual adults (of all ages) had a basic civil right to a certain degree of self-determination of life style. In a society which prizes autonomy, independence, and responsible adult behavior, those individuals who require compensatory care or supportive services due to illness, disability, the effects of aging, or socio-economic dependency, should receive these in a way which least compromises their life style choice.

Therefore, the fundamental principle underlying the development of all training materials - whether focused on information transmission, skill training, or attitudinal change - has been to maximize the vestiges of independence and self-determination of the clients served. This is in contrast to a more traditional medical model of custodial care. In environmental therapy training, for example, the conceptual strategy

has been to develop a more precise understanding of the concepts and dynamics required to operationalize the assumption of patient independence as desirable, so that it becomes a measurable training and service objective.

In self-maintenance skill training, as another example, it would be possible to market the program to emphasize staff efficiency and cost-benefits of training patients to provide much of their own compensatory care. While this is clearly an important by-product of the effective use of this training program, it is nonetheless minimized in favor of the important principle of maximizing patient independence. Evaluation of this program reflects such things as ability to demonstrate new techniques and positive changes on maintenance status indices. Equally important, however, is staff attitudinal data to indicate changes in their perspective about the role, rights, and abilities of their client population.

The next step in the development of a theoretical base for the learning process was to postulate the importance of the interactive process between trainee, program substance or content, and the service context. Since a number of previous statements in this paper have provided a justification for this statement, it will not be expanded here.

It should be said, however, that this approach began immediately to move a potentially eclectic approach back towards the middle of the continuum. By postulating an interactive approach, one must necessarily reject purely organismic learning theories. This is not an easy task since the adult learner is still a dominant figure - especially when

considering the various motivations for participation in adult education.

Conceptual Base: Organismic Theories of Learning

The two main schools which place their emphasis on the organism alone are behavioral and cognitive theories. To the behaviorists, learning is a process by which a particular stimulus elicits a predictable response. The task of educators, therefore, becomes one of encouraging the development of desired stimulus-response bonds and discouraging others. Only those procedures, or schedules of reinforcement, which have proven to be effective in producing the desired product are acceptable. The emphasis is on the amount of knowledge that the student gains as a result; questions of motivation, set, transfer, and student-teacher-environment dynamics are considered secondary or irrelevant.

In cognitive theory, the focus on the organism remains, although with less insistence that only observable behavior is appropriate for analysis. Following the lead of Hull, who originally hypothesized the occurrence of internal mediational processes between stimulus and response, cognitive theorists posit that man organizes the stimuli that are presented to him in various ways and can then act upon them in some reasoned manner. In this framework, the learning process ceases to be the passive exposure to stimuli to which man simply reacts as in the behaviorists' view. The learner takes an active role in organizing the stimuli in some meaningful way.

The roots of both behavioral and cognitive theory are evident in later theories. Mowrer (1960) developed a two-factor theory of learning which synthesized the basic characteristics of each school, so that learning was seen as a combination of both external conditioning and cognitive problem-solving. Gagné (1965) endorsed this general approach, but isolated eight separate learning stages ranging from the simplest form of stimulus-response bonds to problem solving. Of the behaviorists and cognitive theorists, Gagné alone placed the phenomenon of learning in a developmental context, thus implicitly recognizing at least one aspect of the uniqueness of the adult learner. Despite this progressive developmental step, there is no reference to the organism's interaction with the environment. Applying this to the adult education context, his Conditions of Learning still presumes a "captive," or at least "predictable," audience. Although there is considerable room for disagreement among advocates of all of these theories, they stand united on the assumption that learning is properly seen as a phenomenon that takes place as a result of some activity on the part of the learner - be it mediated cognitively or through external reinforcement.

Conceptual Base: Interactionist Theories

A fundamental distinction between these and field theories is the role that the environment plays in learning. The term field theory is used here broadly to include gestalt, phenomenological, and social learning theories. In general, the focus is not solely on the learner, but on the organism-environment interaction. It is not merely what the organism experiences that enables him to learn, but how the

environment interacts with his experience to produce new information.

Gestalt psychologists originally postulated the importance of the person-environment equation in learning, asserting that the individual will take an active role in structuring his perceptions of the environment. If the perceptual field is disorganized - that is, if it contains conflicting or overly disturbing cues - he will impose order on it in such a way that it can be acceptable to him. Reality, in this scheme, becomes relative: what is real is what the individual perceives as being real. In Lewin's (1965) view, for example, both the individual and the environment are in a constant flux, which explains the emphasis on the concepts of organization and perception in the theory.

The implications of such a theory for adult education are far-reaching. To this way of thinking, in contrast to the organism-centered theorists, learning is a very active process. An individual cannot passively learn at all, because he is constantly coloring every situation with personal perceptions. Consequently, motivation becomes a far more important concept, as it determines the number and kind of situations encountered, and will have some effect on how one perceives them. The organism-centered proponents would dismiss internal motivation as relatively unimportant, only acknowledging the importance of the motivation of others who might control cues and reinforcements. Finally, while the sole determinant of the outcome of learning for behaviorists and cognitivists is the end-result or product; to field theorists, the key to learning is the process of exposure to a new situation and the reworking of one's perceptions until the ambiguities are eliminated.

Social learning theories in many ways can be seen as attempting to synthesize field theories and organism-centered theories. In general, they maintain the focus on the interaction of organism and environment, but rely heavily on concepts from both behavioral and cognitive theorists. The tendency for behavior to occur in any given situation is a function of both the individual's expectation of reinforcement in that situation and of the value of that reinforcement.

Just as Gagné took Mowrer's synthesis of behavioral and cognitive theories and placed it in a developmental frame of reference, Cromwell (1963) adapted Rotter's social learning theory into a series of developmental learning theorems. Basically, Cromwell postulated an internal control mechanism which increases in dominance with age, largely as a function of the progressive interaction of experience and reason over time. Estes (1970) praised this line of thinking, but cautioned that as yet, little empirical research had been conducted to support Cromwell's theorems.

Another theory which may be seen as an attempted compromise or bridge between the organism and interaction schools was proposed by Kobler (1965). At about the same time that Gagné was transforming Mowrer's two factor learning theory into an eight-stage developmental theory, Kobler was adding an ethical or conscience factor to the two previously proposed. This existential drive for self-integration reflects the humanistic influences which have become increasingly popular; at least for Kobler, is explained adult learning experiences more fully than conditioning and cognitive problem-solving theories. As such, it at least recognized the uniqueness of the adult learner

and implied a developmental base, although once again we are left without full appreciation of the role of the environment.

The most intriguing and perhaps significant contribution to date in this progression has come recently from Torbert (1972) who seems to have made the inevitable synthesis of developmental and interaction concepts into a unified theory of learning. Although his philosophical approach requires additional empirical support from other types of learning situations, Torbert's model of experiential learning is a useful one here. He maintains that there are four levels of human experience: (1) the world outside; (2) one's own behavior; (3) one's internal cognitive-emotional-sensory structure; and, (4) consciousness, or self-awareness. It should be immediately apparent that all of the previously mentioned theories have attempted in some way to focus upon one or more of these levels, without encompassing all four. Torbert alone has chosen to stress all of them. It is consistent with this theory to suggest that experiential learning will take place only to the extent that an individual maintains contact with all four levels, and can experience more than one level at a time.

The full assurance of objectivity in any system emerges from having independent methods of judging and replicating. In Torbert's model, this objectivity derives from the simultaneous experiencing at multiple levels, which serves to check the observations from more than one point of view. Implicitly, the ability to realize experiential learning is closely linked to both emotional and chronological maturity, and is thus developmental in nature.

In summary, this brief review of the major theoretical approaches to learning has not attempted to be either comprehensive or systematic with empirical documentation. That would be outside the emphasis and scope of this paper. The point to be reiterated here is the need for better theoretical bases for adult education which encompass the learning adult from a developmental point of view, the context of the learning, and the interaction itself. Although Torbert's theory may be questioned by the more rigorous behavioral scientist as having emerged from a narrow empirical base (T-group dynamics), and criticized for its largely descriptive and/or phenomenological approach, nevertheless, its theoretical potential for the area of adult learning is quite significant. It is important to note both the empirical strengths of this theory, as well as its applicability to gerontological manpower training.

First of all, in learning about learning (which is the task at hand), there is an obvious circular problem which, an epistemologist might argue, cannot be resolved through one approach alone - either phenomenological or empirical. The interaction of both is evident in Torbert's work, providing as it does an original framework for both phenomenological and empirical theories. Empirical strength is found in the validity of consistent independent measures of T-group behaviors; and reliability in significant correlations with other valid measures. Secondly, the problem of manpower training - especially in gerontology - is a problem generic to adult education. This implies a theoretical problem that limited success will be derived from combining a non-developmental framework for the learning task with the developmental and environmental perspectives of the learner. On the other hand, it

becomes a measurement problem when attempting to assess the effectiveness of this dual theoretical framework with unidimensional measures.

Evaluation

As previously stated, it is the clear responsibility of academically-based adult education programs to devise a strong theoretical base which carries methodological implications for program evaluation. The earlier-stated assumptions and observations as well as the current theoretical directions lead to both general and specific statements about program evaluation in the final section of this paper.

The conspicuous absence of evaluative data on adult instructional programs is somewhat obvious. It is not the intent of this paper to weight the blame for this against either the scientist or the practitioner. It seems to be one of those things that "everyone talks about, but no one does." The distinguished methodologist, Donald Campbell (1973), recently stated that academics have always been reluctant to conduct evaluation research, but are much less so today than a few years ago. He further says that the highest prestige is ascribed to research which is most closely tied to theory. I find that very reassuring in retrospect for our earlier determination and definition of academically-based continuing education as necessarily hinged to both theory and methodology.

A second general observation here refers to the relationship of learning theory to the well-known evaluation dichotomy labeled process vs. product, intrinsic vs. payoff, formative vs. summative. Product evaluation deals with program effects which have been operationally

defined. It implies a somewhat rigorous scientific approach. Process evaluation, on the other hand, is more dynamic, qualitative, and descriptive, as it refers to the interaction of subject with content and context.

The analogy between organism-centered learning theories and product evaluation is somewhat apparent. Theories of learning which focus on the individual alone place great stress on observable behavior and the measurable products of learning, ignoring the role of the individual's interaction with the environment. Similarly, product evaluators are frequently disdainful of attempts to measure the process of learning, thus choosing to ignore concepts which are not easily operationalized. As a result, few efforts are made to measure interactional or process phenomena, which are frequently viewed as irrelevant.

The product evaluators and organism-centered theorists may be contrasted sharply with process evaluators and interaction theorists. Just as the interaction of the learner and the environment constitutes the central element of learning for field theorists, so are process evaluators concerned with the dynamics of the learning situation itself, rather than information handling and content mastery on the part of the learner.

The implications previously discussed concerning the realtive inadequacies found in applying behavioral and cognitive theories to adult education now become even more important. If such theoretical approaches fail to account for the learning adult from a developmental and contextual view, then similar failures will occur with learning measures which also ignore those developmental components which are of prime importance

to the adult learner. The fact that such concepts are appreciably more difficult to accurately quantify would disturb the product evaluator and behaviorist alike. However, when such concepts are central to the phenomenon being measured, then such difficulties must be confronted directly, father than ignored in the research design.

Evaluating adult education programs is unquestionably an exceedingly complex enterprise, and the inclination to deal only with readily operationalized concepts is understandable.

Qualitatively, the evaluative process is complicated by a number of characteristics of adult education which only add to the difficulty. For example, most programs are both informal and of short duration, making assessment of change more difficult. It may be of even greater importance that the nature of the goals of any given program will inevitably be multi-dimensional and are often intangible; and they will probably vary among the students, whose goals in turn will undoubtedly be different from those of the teacher, the program administrators, or society. Moreover, these goals will not be static, and in some cases will be fairly remote, thus complicating the decision of when and how often to attempt to identify them. Finally, there is the critical problem of assigning priorities for goals according to basically qualitative criteria.

Conclusion

The length and style of this paper make it somewhat redundant at this point to summarize the earlier observations and assumptions in

terms of subsequent statements regarding learning theory and evaluation. Therefore, I would like to conclude with three specific recommendations.

1. Research models

The easiest recommendation here is to take the best of both worlds. Quasi-experimental designs which account for process and the interaction effect must be selected over other, more rigorous alternatives. This view is currently being championed by Guttentag (1973), Weiss and Rein (1970), and others in their near-rejection of the classical paradigm as inappropriate. At the same time, agreeing with Campbell (1973), process evaluation per se is not a viable alternative to the classical experimental paradigm - especially when the former yields only subjective or descriptive data. The resolution of this dichotomous position must come from using some common sense. Until a theoretical base about adults as learners becomes more sophisticated, a certain amount of internal validity must be sacrificed. Similarly, decisions regarding the marketability of results must be related to confidence limits rather than levels of significance/non-significance. Also, there is little need to apologize for compromising assumptions like random sampling or additivity, which underly the derivation of the F-distribution or ANOVA if such compromises can be demonstrated as non-differences.

The evaluation of the environmental therapy training program, for example, was originally designed to compare program effectiveness (according to a number of criteria) at three state hospitals. Common sense, however, urged that the three contexts be rated according to different criteria than those used by the institutions and the state;

and that the interaction of Trainee X Content be carefully measured. Despite the state certification and civil service ratings which would make these three sites almost interchangeably synonomous in terms of personnel, client population, and health care, our ratings indicated wide diversity, resulting in no real grounds for between-group comparisons.

2. Continuing Education Models

The initial testing of the Environmental Therapy and Sensory Impairment programs during the past year have raised serious questions regarding the value of a traditional and quite typical continuing education approach, where the training of a small number of select service providers (usually administrators with minimal client contact) is conducted at a neutral site. This type of training, although providing new content and information, does not include the key variables in the process - the service or job context itself where the content moves from the abstract to an interaction with important other people - i.e., both recipients and fellow workers. Continuing education, as defined here, requires an influencing and interacting environment, and not a controlled laboratory or neutral site.

An example of this was seen in the Sensory Impairment training program where the success of simulated empathy exercises hinged largely on the degree of social and working familiarity existing among the trainees. A more complex illustration of this comes from the Environmental Therapy training program. Virtually all staff members in the geriatrics unit at one of the three sites were trained in their predominantly custodial environment. Although the attitudinal data -

apparently yielded nothing of great value, some interesting things have occurred since the training program was conducted. Rates of staff turnover - especially at the non-professional levels - have declined sharply; the number of patients returned to the community has increased significantly; and, perhaps of greatest importance, the unit itself has been environmentally and functionally modified to reflect goals and objectives which contrast with the custodial care philosophy (Hickey, 1974b).

Although the direct relationship between these results and the training program is difficult to assess, much weight must be assigned to two things: the interaction process (Content X People X Context) generated by training an entire staff over a short period of time in some principles highly relevant to their work roles, and directly related to the changes which resulted following the program; and to the objective of involving lowest staff level personnel in all phases of the training. Measurements of effectiveness of content showed that the lowest level of staff members benefited most from the program. The saturation technique as a continuing education methodology seems a valid one to be recommended.

3. Instructional Materials and the Academic/Community Model

Another variable in the process of evaluating continuing education is the validity of the content. No amount of personal interaction or contextual support will salvage a program which is irrelevant to the goals and functions of the trainees and their work setting. Here again, our experiences pointed to the necessity for inter-relating academic research and resident instruction with continuing education programs -

especially in a professional college. Admittedly, the priorities of the service provider will not usually parallel those of the basic researcher. However, the medium of translation is instruction - whether campus-based or continuing education. The needs of the practitioner can help to shape the ideas for research; and the research findings can provide answers for some existing problems.

The Sensory Impairment and Environmental Therapy curricula represented a translation of numerous relevant research findings from the decade of the 1960's. In journal state, however, this research lacked the necessary transpositions for modification and adaptation to settings which differed from the original demonstration sites. Similarly, development of the Basic Gerontology curriculum involved some rethinking of a corresponding resident instruction course, and the degree of relevance of some of its subject matter in the service delivery system. As a result of this project, the perspective on the undergraduate course seemed to shift from the academicians' view of what constitutes basic knowledge in this field, to the question of what knowledge and competencies are required of our undergraduates as future professionals.

Similarly, if self-maintenance skills had been taught from only an academic perspective, then it is unlikely that health status indices would have been considered as evaluative measures. In many ways, they are accurately viewed as pseudo-experimental, with quantitative measures of change-over-time of something which cannot be defined. In this case, however, clinical experience with the client population seemed to

demonstrate that the performance of self-maintenance tasks can be operationalized to allow for measuring changes objectively.

Finally, it should be said that these recommendations do not begin to comprise the full definition of either a model for adult learning, or a technology of instruction. It is not wishful thinking to anticipate being able to make some constructive progress on this in the very near future, and to be able to address this issue again soon, but more specifically. Recently collected data (in collaboration with Professor Hultsch) deal with the effects of a specialized content and dual instructional techniques as they relate to differently defined adult trainees. Other studies will continue to look at the relationship of the training process to service effectiveness. In a Future Shock era when society needs to consider very seriously the adult as learner, the important issue is to make rapid progress in the science of learning and the technology of instruction, regardless of labels or models.

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CONFERENCE EVALUATION AND CLOSING

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I would like to offer some reflections on the conference, rather than try to provide a summary. The papers are already summaries of large bodies of knowledge and to summarize them further would not be particularly useful. A first point I want to make is that, looking over the papers as a whole, and after thinking about what they have to say about learning, I find no support for the idea that paper reading, as it has been used at this conference, is a good form of instruction. Most authors of papers on learning do not practice what they preach, perhaps because tradition, and not knowledge of learning, structures teaching procedures. I thought that the person who came nearest to doing what he advocated was Combs. He didn't read a paper. He talked to his audience; he was watchful of responses in his audience and, hence, the presentation was a 2-way interaction within the limits imposed by the fact that he had to perform from a platform. He did a marvelous job of illustrating the kinds of teaching techniques that derive from his theory. Others, were not only less successful in illustrating the practical applications of what they had to say, but preferred to remain tradition bound in their performance, perhaps illustrating how hard it is for the scientist to have impact on what happens in teaching situations. Perhaps authors may take comfort in the fact that, even though reading a paper is not a good way to teach, listeners do still learn from such a performance.

The papers show quite clearly that, with the exception of the operant approach, there are few psychologists who can offer teachers a bag of tricks to help them in the classroom. Of course, teachers want a bag of tricks, and may even grab at a poor bag of tricks. The main impact of learning theories on the classroom comes from an entirely different direction. Learning theory has impact on classroom practice mainly because it provides a conceptualization of the nature of man, and this conceptualization has impact on teaching.

Sometimes I think that the conception of man implicit in much learning theory has been quite disastrous, when taken and applied in this kind of way, because it provides a very unflattering conceptualization of the nature of man. This influences teacher-learner relationships with deplorable results. Learning theories, of course, even the most sophisticated ones, are gross abstractions. They tend to leave out a great deal of what the philosophers tell us about the nature of intelligence; and rarely encompass the essential components of the nature of man. In fact, to me, very often they leave out quite essential dimensions or even deny their existence. I, personally, would have to assume man has a decision-making system internal to himself, a kind of executive control system. It is there. To deny it is to deny the obvious; yet, typically learning theory denies the obvious and excludes it because it doesn't "fit" as part of a puzzle that the scientist can readily solve. As our first speaker told us, most research workers want puzzles they can solve, and puzzles they can't solve they forget about. Much of research on learning involves solving puzzles the scientist sees as attractive because he can solve them. Learning theories, it seems, are grossly simplified conceptions of the

nature of man and are extremely limited in what they tell us about the human being. The great danger comes when scientists go out and say, "This is the nature of man! We will act on this basis." Very peculiar programs can result from it. So, I would like to go over briefly the four conceptualizations of the nature of man which arise from the four positions presented at the conference. I'll try to summarize these positions and indicate some of their strengths and weaknesses, and point out what they tend to do to education, for good or for bad, when they become a part of the teachers' and pupils' own thinking about themselves.

First, let us consider Combs' theory which, as I said before, was presented in a way compatible with the theory. This was a very unusual presentation, and, from my point of view, a very effective one. The central concept of man according to this view, as I see it, is that man's inner experience is that which controls his behavior. Man is influenced not by events but by his interpretation of events, by events as they appear in his experience or as philosophers and some psychologists say, in his phenomenal field. The control system, the locus of control, seems to me to be internal to the individual; it is not external in the sense of the teacher controlling the learner. The learner is always in control - his control system is the only control system he knows. Basically, I think this position is one which is highly acceptable to those instructors who want to relate to students, who understand students or who have a humanistic philosophy which they apply to their relationship to others. In terms of evidence, I think the strongest evidence to support it is the individual's personal experience - intuitive evidence admittedly, but I certainly would not reject intuitive evidence. Now, if I were writing a

scientific treatise in traditional scientific terms, I might reject this evidence. But, for practical purposes I would not reject it. I would accept it as a kind of evidence which is extremely important. Yet, there is also quite a body of objective evidence which also fits this whole notion of learning requiring personal meaning. Piaget's position, for example, with his conceptualization of schema, which require that every piece of knowledge coming in has to fit into the individual's own organization of knowledge, gives support to this point of view. To me, it also fits very well with the little we know about the nature of teachers who promote good learning. Studies of this problem have been summarized by Rosenshine and Furst (1972) who find that the effective teacher has to be rather supportive, positive, sensitive to other individuals, and the kind of person who is enthusiastic about the whole business of what is happening in the classroom. The picture of the effective teaching we find in such studies, I think, fits very well my understanding of Combs' conceptualization of learning.

But, like all conceptualizations of learning, it doesn't cover everything. There's obviously a great deal of evidence that one can gather against it. For example, all of us pick up all odd kinds of pieces of information without intending to learn. We call this incidental learning. Incidental learning is undoubtedly extremely important. In fact, some writers, who are well-established psychologists, have recently taken the position that more information gets into our systems by incidental learning than by any other kind of learning process. I don't see incidental learning as fitting into Combs' position, but again this

doesn't bother me. A good conceptualization of learning doesn't have to cover everything. It doesn't matter if some things don't fit.

In the present attitude of adults towards learning, again, I see Combs' position as a very practical kind of an approach, for it incorporates a philosophy, a view of learning, which is acceptable to adults at this time in history. Adults are no longer learning because they are under some great compulsion to learn as they have been throughout history. In the past, youth and adults have been willing to learn what others told them to learn, because at the end of the educational program there was some great reward. Under those conditions learners were forced through rather disagreeable learning processes and they would stay in the learning situation in order to gain the promised rewards. Little of adult learning today can offer great rewards, though. The exception is perhaps continuing education.

A second learning theory presented was that of operant psychology. Over the last ten years I've spent considerable time trying to summarize what we know about this approach, what is the positive evidence for it and so on. The conception of man provided by operant psychology is that man's behavior is controlled by his environment, particularly by events that are reinforcing. In contrast to the Combs' approach, the control of the learner is always from the outside. In Combs' approach, control is basically from the inside. In taking the one position or the other, you are choosing more than anything else between an external control of man and an internal control of man.

Operant psychologists have been extremely busy doing a goodly number of studies but they are not always too cautious about generalizing

from those studies. Lack of caution, however, has been a characteristic of psychologists for the last hundred years, so operant psychologists are no different from their predecessors. I hear it frequently said that the position of operant psychology is supported by a mass of evidence. Yes, it is; but the evidence is confined in large measure to that derived from very young children, mentally handicapped individuals, psychotic individuals in institutions and, of course, laboratory animals. Applications to either normal children or normal adults in terms of actual learning outcomes by and large have been unsuccessful. The most notable unsuccessful applications of this technique came in the contract programs in which operant psychologists contracted to produce results in the schools. The expectation of the psychologist was that they would produce learning maybe twice or three times as great as in a normal setting. But the end result of considerable massive experience with contract programs was that these operant programs didn't get any great increase in learning; in fact, they didn't get any increase at all. Hence, I don't find any good basis for applying operant psychology to either adult learners or to the learning of normal children of school age. At least it seems to me we don't have any evidence that such attempted applications are even justifiable. Skinner says that operant psychology is 100 per cent applicable to such situations, but he is a little biased because he started it all. Piaget, who is also a very notable psychologist and who would be certainly ranked with Skinner as one of the greats of his day, takes a very different position. He says operant psychology deals only with the trivial. It has nothing to say about intellectual performance, or about the nature of man as an intelligent being.

I'd like to make one other comment about individualized learning which is constantly brought up in relation to operant psychology. Individualized instruction has always looked like such a beautiful idea - everyone working at his own pace. I've seen programs where this is working. There is a program, for example, in Pennsylvania, where every child works completely at his own pace (and I spent quite a lot of time in that school - many days watching the children), and one thing that came out of this observation is that the children, to me, seemed to be becoming more and more socially isolated and more and more unhappy. When every child is working on different materials, there is no basis for one child interacting with another, and they do not interact. Individualized instruction has side effects which we have to recognize. We are not recognizing the side effects of educational technology in the way we should be recognizing them.

The third model of learning discussed at the conference was an information processing model. Such models are new to the field. They provide a view of man which is a little more flattering to man than that provided by operant psychology, which provides a very unflattering view. Operant psychology is basically anti-intellectual in this respect. It says that man is at the mercy of the whims of every wind and draft that comes his way. Information processing models, on the other hand, say that the important thing about man is his intellect. Man is viewed as a complex, information organizing system. Man is not so much a response learning system as an information learning and organizing system. There isn't a single information processing model but a whole series of information processing models. Some stress man as an information taking-in,

organizing, structuring, and retrieving kind of a system. That is a simplist kind of information processing model of learning. Di Vesta's model is a much more complicated conceptualization. He sees man primarily as a rational, mathematical, logical system.

The locus of control in information processing systems is partly internal and partly external, which I think makes a great deal of sense. Some information processing theorists have even come to the point of trying to postulate what one might call an internal executive control system. Many information processing models have been developed through an analogy with computers. We can simulate on the computer information going in, then being processed, handled, retrieved, and transformed into various kinds of elements, e.g., concepts, strategies, hypotheses, understandings, etc. Computers, as you know, have executive control systems of some kind that control the computer by making decisions. Computers cannot be just input-storage-output systems. So, information processing models have shown some potential for introducing into the psychology of learning the something that you would call a decision-making self. Psychologists get very squeamish about this. They don't like it, but they always drag it in by the back door. Even our friends, the operant psychologists, drag in this concept by the back door. For example, there's a book on self-reinforcement. Well, the self has no place in the Skinnerian system whatsoever but the omission is so serious that operant psychologists have not managed to live with it. Thus, operant psychologists now tell individuals how they can reinforce themselves and make decisions about reinforcement so as to influence their own behavior. This raises the problem of what is inside that makes these decisions and how it is

different from the behavior that is changed. Through information processing models, I think, we're beginning to develop a concept of an executive self which, to me, is a very important kind of concept to develop. Whether we can develop it or not, as a scientific concept, I really don't know. It may be beyond our intellectual capabilities to do this. How far is it possible for us to develop a model of ourselves? A system may not be able to develop a complete model of itself. There are limits to how far any system can describe itself. A system probably can never describe itself fully and completely. We may be under great limitations in what we can do in this respect.

The conception of learning provided by information processing models is, I think, one which is fairly acceptable to teachers and students and does not interfere with the relationship between them and it does not violate a humanistic kind of relationship. Information processing models have some capacity for producing a bag of tricks for the classroom teacher, but I'm not convinced that a teacher is better off with a bag of tricks than without one. I'm very doubtful as a matter of fact, whether a teacher should have a bag of tricks at all, but information processing models do have a lot of tricks to offer the teacher. For example, information overloading takes place easily when dealing with a system that can only take in so much information at a given time. So, be careful as a teacher - don't overload your students - don't let your students overload themselves. So, if a student is overloaded, help him overcome the overload by helping him to take in the information piece by piece. The notion that you can only learn so much in a given time is, also, I think, a very important concept which comes out from information processing models.

Information processing models can offer the teacher many tricks to facilitate learning. Such tricks can be effective provided the teacher remembers that good teaching is much more than a bag of tricks.

Finally, let us consider expectancy models, the fourth type of model. This type of model doesn't really deal with learning. It deals with how to entice the learner into the learning situation more than with anything else. The assumption is that, if you can just have the learner there, then learning is going to take place. This I find is a rather dubious kind of assumption, but in terms of setting up programs and scheduling courses and things of that type, we're all faced with the problem of getting students to a place where they will want to learn or unlearn something. There have been some attempts to apply expectancy theory to this problem. We can't evaluate this form of theory yet, at least I can't evaluate it. I don't find any very solid evidence that in expectancy theory there is something highly useful to people who are managing educational programs. The conception of man which comes from expectancy theory is that man is a goal-oriented and goal-valuing system. That is all right as far as it goes, but it doesn't go far enough to be of much practical use. Man is so much more than a goal oriented creature.

Technology crept into the conference at various places, in addition to the major contribution by Mitzel. The implication typically was that, once the right technology has been developed, learning will proceed efficiently and automatically. The position is reminiscent of engineering technology thirty years ago, when engineers were saying, "Give us the money and we will develop the technology needed to provide the abundant life for all." I do not have to point out the disasters that engineering technology

has produced, and the ultimate disaster would be an uninhabitable planet. Educational technology has equal capacity, with other technologies, to produce disaster. Yet we are all too prone to dash ahead with technological ventures in education, fascinated by the gadgetry, but ignoring the deleterious effects that such devices may have on the quality of human life. Two years ago I wrote to the American Psychological Association and said, "Technology is bursting forth in the behavioral area; shouldn't you do something about finding out what are the bad side effects of this technology? Is it all going to be as beautiful as people say it is going to be?" The American Psychological Association said, "No, they weren't looking into it. There didn't seem to be much interest in that aspect of technology." But, I think we have to be both interested and concerned. Those sociologists who've looked at other aspects of technology in relation to behavior note two very important and bad side effects of technology. One is the socially isolating effects that technology has. We are becoming a society where we are more and more isolated from one another as individuals; there is less opportunity to interact meaningfully; there is less opportunity to do things together, less opportunity to share, and so on. If you live in the suburbs, as many of you do, you'll know that you are isolated from your neighbor. Your neighbor has a mower and you have a mower and you watch each other mowing the lawn. You never have to borrow anybody's mower. Then you all go off to your rooms and watch your own little programs on television - all by yourselves. Much of educational technology, it seems to me, is doing just that to individuals, isolating them intellectually from one another. I think that teaching should be an exciting social experience.

This is our primate way of life. Even little baboons are raised and educated in the highly social environment organized by the large male baboons of the community. But, I don't see many of the large male baboons of the human community doing much to improve the socialized aspects of learning.

I think if we are going to have, what you might call, quality of life in education (and I think education should be a place where one can achieve quality of life), it has to be a social kind of condition. Man is a social primate, basically. To deny him his sociability and to cut off his opportunity for social interaction, will do to man just what it does to primates in laboratories - they become miserable, mean, isolated, and snapping creatures. I think some of us are getting that way already. Maybe it's old age on my part, I don't know. But, this disturbs me.

A second thing which disturbs me about the proposal to expand technology of education - again pointed out by numerous sociologists - is that man has to learn to free himself from being controlled by machines. Up to a point, he should, maybe, allow some control. A factory whistle, yes - you've got to have people arriving on time. But to be controlled by machines as a way of life is to relinquish much on one's humanity. I would recommend to your attention the beautiful book by Yablonsky (1972) entitled "Robopaths." Robopaths are all the humans who have come completely under the control of machines and a mechanized society. Education should be the place where man is freed from that control, where he acquires freedom and where he recognizes that in his humanity he must not be subservient to a mechanized civilization, but use a mechanized civilization to his advantage, without subservience. In educational technology I see a

trend in the opposite direction to increase man's subservience to mechanical devices and particularly to computers.

Finally, I was so glad to hear some conference participants say that teaching is an art. Yes, teaching is a performing art. Teaching is as much a performing art as going on a stage and performing a dance. Teaching has to be a performing art; teaching has to be an experience which has aesthetic qualities to it. I think all humanistic relationships between people have to have aesthetic quality. If a relationship does not have that quality, it is a very inferior kind of relationship. If teaching is to be a situation in which experience leads not only to learning but to quality of living and to the enhancement of the important values in life, then I think teaching has to be viewed primarily as a kind of performing art where the teacher's performance in the human relationship area has aesthetic quality.

I am personally much more interested in developing the quality of life in instructional situations than in doing such things as reducing cost effectiveness. In my estimation, matters like reducing cost effectiveness are really quite unimportant when it comes to education. In education the basic problem is how to provide a person with a quality of experience which will benefit him, and society, for a lifetime.

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